Ministry of Economic Affairs and Climate Policy

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Update of the National Energy and Climate Plan 2021-2030

Colofon
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Content

Section A
National plan

1 Overview and procedure for adoption of the plan

Before you are the update of the National Energy and Climate Plan (INEK) of the Netherlands. The INEK, which was presented to the European Commission at the end of 2019, sets out the broad lines of climate and energy policy in the Netherlands for the years 2021-2030, including the policy resulting from European commitments.1 In 2019, INEK was largely based on the Climate Agreement with the involvement of more than one hundred societal (public and private) parties.2 This was also the basis for the first Climate Plan3, adopted in accordance with the Dutch Climate Law.

A lot has happened since. A European Climate Law entered into force in 2021, tightening Europe's 2030 climate target from 40 % to at least 55 % compared to 1990. Later that year, the European Commission presented the so-called "Fit-for-55 package", a major legislative package with strengthened 2030 climate and energy policies to implement the new climate target. In 2022, the Dutch climate targets were tightened. In order to reach climate neutrality by 2050, the Netherlands tightened the 2030 target to at least 55 % of CO2reduction. In order to achieve this goal, the policy was targeted at 60 % in 2030. The policy in the Climate Plan was updated in June 2022 with the Climate Policy Programme in response to this increased target.4

After the outbreak of the war in Ukraine, energy prices rose to high levels and Europe's security situation changed completely. The Council then adopted a sizeable package of crisis measures to increase energy security and reduce energy prices. At the same time, the Council and the European Parliament concluded negotiations on the Fit-for-55 package, the decarbonisation package and the electricity market reform (EMD) in 2023, which has resulted in a tightening of targets to achieve the European climate goal and increase security of supply.

The Dutch Climate Act was brought into line with the European Climate Law at the beginning of 2023 so that the Netherlands has reduced its net greenhouse gas emissions to zero by 2050.5 The ambition for the electricity system was further strengthened with the objective of a CO2freenational electricity system by 2035, which is affordable and reliable. In addition, an additional policy package was presented in the Spring decision-making process in April 2023.6 7This was necessary because, according to the 2022 National Climate and Energy Outlook (KEV) of the Environmental Planning Agency (PBL),8 the policy was not yet fully in line with the objective of reducing emissions by at least 55 % in 2030. The expected impacts of that additional policy package have been taken into account in this update on the basis of the 2023 KEV. The National Energy System Plan (NPE) at the end of 2023 sets out the direction of development for the energy system until 2050. Finally, this final update by INEK incorporates the policy announced in the April 2024 Spring decision-making process.9

On 16 May 2024, the PVV, VD, NSC and BBB political groups presented the Main Line Agreement 2024-2028, which will be the basis for the possible new cabinet.10 The further development of this Lead Line Agreement in a coalition programme will lead to new or adapted policies, replacing the existing policy as currently described in the INEK. As the Main Line Agreement will be further developed, it is currently not possible to identify an exhaustive overview of all policy changes. On a number of points, the Main Line Agreement is already so concrete that a policy change is obvious, for example with regard to the policy on hybrid heat pumps. In these cases, this is already mentioned in the INEK.

The impact of the Main Line Agreement on the planned policy or policy is reflected as far as possible by the Environmental Planning Agency in the upcoming Climate and Energy Outlook. An adjustment of the policy will be included in the next INUK progress report, which is due to be published in March 2025. In the meantime, the Netherlands will also

1Parliamentary paper 32813, No 406.
2Parliamentary paper 32813, No 342.
3Parliamentary paper 32813, No 406.
4Parliamentary paper 32813, No 1049.
5Parliamentary Document 36169, No A.
6Parliamentary paper 32813, No 1230.
The 2022 Climate7 Policy Programme and the Spring 2023 decision-making process had already been taken into account in the draft update INEK on
30 June 2023 was sent to the European Commission.
8Parliamentary paper 32813, No 1112.
9Parliamentary paper 32813, No 1374.
10Parliamentary document 36471, No 37.

be in regular contact with the European Commission on the results of the Climate and Energy Assessment and its policies.

Negotiations on the package of European climate and energy regulation proposed in 2021 were largely concluded in 2023. As far as possible, the (planned) implementation of these revised rules has been taken into account in this update. The European Commission's recommendations on both the 2019 INEK and the 2023 draft update have also been incorporated as much as possible in this update (see Annex 1 for an explanation).

In addition, a public internet consultation took place at the end of 2023, where any Dutch or civil society organisation could comment on the draft update of the INEK and on the Climate Plan Contourenbrief,11 which will serve as a basis for the new 2024 Climate Plan. Where relevant, these views have been taken into account in the present INEK update.

The policy part contains the new, reinforced targets (Chapter Two) and current and envisaged policies (Chapter 3). The analytical part describes developments in the Netherlands with regard to the five European energy dimensions. Chapter Four describes the current situation, based on the established policy as of 1 May 2022. In particular, the KEV of 2022 was used.12 Chapter Five deals with the (wider) effects of the envisaged policy as described in Chapter Three. Use was made, inter alia, of the 2023 KEV, which took into account the policy known on 1 May 2023.13

In addition, the INEK also includes a number of annexes (1 to 7), to which reference will be made from the relevant paragraphs.

1.1 Summary

I Political, economic, environmental and social context of the plan

Climate change is the challenge for our generation. Our Earth is warming up and we are increasingly facing extreme weather conditions. This threatens the lives of people, animals and nature. The Netherlands and Europe are already working hard to slow down and eventually stop this rapid change. In the coming years, we need to work to significantly reduce greenhouse gas emissions. The great efforts required at national, European and global level take place in a geopolitical context which is very complex. For example, the war in Ukraine, the related gas crisis and rising energy prices in Europe have demonstrated the importance of affordability and security of supply of the energy system.

The Netherlands is a densely populated country. At the end of 2023, the population was 17.9 million. The population is expected to increase further to 18.5 million in 2030 and 19.2 million in 2040.

The economy has quickly recovered after the coronavirus crisis. On average, Gross Domestic Product (GDP) is expected to grow by 2.2 % per year between 2 020 and 2030. More than three quarters of GDP is currently achieved in the services sector. Exports continue to make an important contribution to economic growth, alongside investment and household consumption. In the longer term, ageing of the population is holding back labour supply and thus potential economic growth.

The basis of the Dutch climate and energy policy is the Dutch Climate Act of 2019 and the 2020 Climate Plan. The Dutch Climate Law was amended in 2023 and aligned with the European Climate Law. The Netherlands will have reduced net greenhouse gas emissions to zero by 2050. By 2030, at least 55 % net greenhouse gas reduction compared to 1990 should be achieved. In order to achieve this goal with certainty, it was agreed to focus the policy on a higher challenge of around 60 % in 2030 by taking into account an "overprogramming" of measures. The policy has been developed in the Climate Policy Programme published in June 2022, and later complemented by the so-called "Spring Climate Decision" in 2023 and 2024.

II Strategy on the five dimensions of the Energy Union

In 2015, at the request of the European Council, the European Commission adopted an Energy Union Strategy for an affordable, secure and sustainable energy for Europe and its citizens. The Energy Union is based on 5 pillars: decarbonisation, energy

11Parliamentary paper 32813, No 1311.
12Parliamentary paper 32813, No 1112. The 2023 KEV was not well usable in chapter four, as it was not a policy variant with only defined policies are in place. The level of detail of the KEV2022 was also insufficient to complete the tables in the annexes.
13Parliamentary paper 32813, No 1307.

efficiency, energy security, an integrated internal energy market and research, innovation and competition. This resulted in the Clean Energy Package finalised in 2019, with greenhouse gas reduction, renewable energy and energy efficiency targets for 2030. In 2021, the European Union committed in the European Climate Law to reduce greenhouse gas emissions by at least 55 % by 2030 compared to 1990. By 2050, net emissions will move to zero. To achieve this, the targets set out in the Clean Energy Package have been strengthened in 2023 through the "Fit-for-55 package", with a European renewable energy target of 42.5 % by 2030 and a European energy efficiency target of 11.7 % compared to the 2030 baseline from 2020.

Decarbonisation (including renewable energy)

National climate and energy policies aim to further reduce greenhouse gas emissions. This is done through a combination of energy savings, increasing renewable and CO2free production capacity and reducing fossil energy consumption. To finance climate and energy policies, a EUR 35 billion Climate and Transition Fund for the next 10 years has been established, complementary to the current Sustainable Energy Subsidy Scheme SDE + +. This fund helps build the necessary energy infrastructure (electricity, heat, hydrogen and CO2), achieve green industrial policy and make mobility and the built environment more sustainable. Additional efforts are also being made to stimulate the supply of renewable energy sources, by focusing on additional offshore wind, salon-on-rooftop, geothermal, green gas and aquathermia, as well as the production and import of hydrogen on. In addition to renewable energy, other low CO2technologies were also used to reduce dependence on gas imports, with the intention of keeping the Borssele nuclear power plant longer open and taking the necessary steps for the construction of two new nuclear power plants.14 It also focused on investigating the phasing out of financial incentives for fossil fuels and finally ended the possibility of gas extraction in the province of Groningen.

At the same time, measures are taken to steer the end of technologies for which there is no place in a climate-neutral future. Examples include the ban from 2030 on using coal for electricity production, the requirements for new boilers and the ban on new sales of fossil combustion engine in 2035.

The Netherlands expressed a new ambition in 2023 for a CO2free electricity sector in 2035. Funds have been set aside to achieve CO2freely adjustable power, for example by incentivising the use of hydrogen. The Netherlands is also focusing on electricity storage by investing in battery innovations and incentivising batteries in large-scale solar panels. It also allows solar energy to be used if the sun does not appear and relieves the electricity grid. At the end of 2023, a joint declaration by the Pentalateral Energy Forum was also15 signed under the Dutch Presidency, setting out the objective of a CO2free North-West European electricity sector in 2035.

The consumption of renewable heat and renewable fuels for transport will also be promoted.
For heat, the main focus is on the use of (hybrid) heat pumps and heat networks. In mobility, blending biofuels and electrification are important ways to stimulate renewable energy consumption.

Energy saving

Nor do we have to generate, pay, transport or import energy that we do not use. Energy saving is an important pillar of a sustainable energy system. This is why the Netherlands is ambitious in terms of energy savings. In the Netherlands, energy consumption is reduced to 1.935 petajoule primary energy and 1.609 petajoule final energy. The Netherlands has been working on the outline of the National Plan for Energy Savings since 2023, in order to achieve these targets.

Security of energy supply

The war in Ukraine has underlined the importance of intensive European energy cooperation to safeguard public interests such as security of supply and affordability of energy. In the context of REPowerEU, EU Member States have taken several measures to phase out Europe's dependence on Russian fossil fuels as soon as possible and to increase the security of supply of natural gas and reduce high prices for European citizens.16 Agreements have been made, inter alia, on the timely and adequate filling of the gas storages, the achievement of gas savings and the setting up of a mechanism for the joint purchase of gas.

Internal energy market (including energy poverty)

The Netherlands has included an energy reform package that monitors four energy market reforms. This reform package aims to mitigate grid congestion and simplify permitting of renewable energy infrastructure projects. These measures are included in the

14The Main Line Agreement is expected to change this policy. For more information, see the box on the main lines agreement in chapter 1 of the INEK.

The Pentalateral15 Energy Forum is composed of Austria, Belgium, France, Germany, Luxembourg, the Netherlands and Switzerland.

16Parliamentary paper 22112, No 3438.

REPowerEU chapter of the Recovery and Resilience Plan, which is part of the broader Dutch climate and energy policies and measures included in this INEK. It also looks at ability to pay. Strong shoulders are expected to be able to bear heavier burdens: burden increases for low- and middle-income earners shall be minimised as much as possible. When designing subsidy schemes, we look at whether public support reaches households and entrepreneurs who need it most. Because of money concerns, limited time or less digital skills, there is a growing group of people struggling to get involved in the transition. The Netherlands further supports this group with subsidies and delivery. For example, an occasional and temporary price cap for retail consumers for gas, electricity and heat was introduced in 2023.

Research, innovation and competition

The Dutch approach to research, innovation and competitiveness has been partially adjusted compared to the INEK for the period 2021-2030. In a generic sense, the Netherlands aims to invest in innovation of 3 % of GDP in 2030. This is done as much as possible in public-private partnerships to stimulate valorisation and increase knowledge dissemination. On the one hand, we are deploying generic innovation toolbox (investment funds, fiscal measures) to promote innovation and strengthen the competitiveness of the Netherlands. On the other hand, we are deploying targeted toolbox specifically aimed at accelerating the climate and energy transition. We do this through mission-driven top sector and innovation policy (MTIB).

The biggest change in public-private innovation funding compared to the previous reporting is the introduction of the National Growth Fund. With the National Growth Fund, the Netherlands is mobilising between EUR 2 021 billion and EUR 202 520 billion for targeted investments for structural and sustainable economic growth.17 The National Growth Fund will focus on the two areas of “Knowledge Development” and “Research, Development and Innovation”.

III The main objectives, policies and measures of the plan

The original Climate Law aimed at reducing greenhouse gas emissions of 49 % in 2030 compared to 1990 and 95 % in 2050. The recent adaptation of the Climate Law has increased the target to at least 55 % by 2030. By 2050, emissions in the Netherlands should be ‘net zero’, making the Netherlands part of a climate-neutral Europe by that year, in line with the European Climate Law.

The Netherlands, as a Member State of the European Union, also contributes to several climate and energy goals. Table 1 gives an overview of the main climate and energy targets for the Netherlands in 2030 and the estimated target range. The table contains only the targets for which a reasonably reliable quantitative national translation is known.

Table 1 The main climate and energy targets for the Netherlands in 2030

Target in 2030	Source	Expected national contribution
At least 55 % reduction in greenhouse gas emissions compared to 1990 (including emissions from land use)	National Climate Law	103 megaton CO2eq. (delegation)
Emissions budget for ESR sectors in 2021-2030	EU Effort Sharing Regulation (ESR)	833 megaton CO2eq. (cumulative)
Binding national target for the land use, land use change and forestry (‘LULUCF’) sector for 2030.	EU Land Use, Land Use Change and Forestry (LULUCF) Regulation	Net emission reduction from 0.435 megaton CO2eq in 2 030 compared to average 2016-2018
Indicative contribution to binding EU renewable energy target (EU-wide 42.5 % by 2030	EU Renewable Energy Directive (RED) according to 2023 revision	According to formula at least 39 %, Dutch contribution is based on the KEV2023 range between 32-42 %
Indicative contribution to energy efficiency target for indicative EU primary energy consumption target and binding EU final energy consumption target (EU-wide 11.7 % in 2030)	EU Energy Efficiency Directive (EED) as revised in 2023	1 935 petajoules (primary consumption) 1 609 petajoules (final consumption)
National cumulative energy savings from national policies in the period 2021-2030 (Article 8)	EU Energy Efficiency Directive (EED) as revised in 2023	1.285 petajoule (cumulative saving)

The Climate Policy Programme of June 2022, which complements the 2020 Climate Plan, and the additional measures agreed in the spring packages of 2023 and 2024, have developed policies aimed at the higher 2030 target. When the policy known on 1 May

17The Main Line Agreement is expected to change this policy. For more information, see the box on the main lines agreement in chapter 1 of the INEK.

2023 (for which an impact assessment could be made) is developed and implemented in a timely manner in all sectors, the KEV2023 expects greenhouse gas emissions to be 46 to 57 % below 1990 levels. This brings the -55 % target within reach. Conditions are that the climate plans should be designed and implemented as intended and that also non-controllable factors.

(such as energy prices and the weather) are beneficial. Emissions from ESA and LULUCF sectors are also within reach according to the KEV2023.

According to the KEV2023, the share of renewable energy increases to 2030 to 42 % in 32. The expected minimum national indicative contribution of 39 % from the Netherlands to the European renewable target is therefore within the range of the estimate. As a result, the expected national contribution should be achievable with the policies adopted in the KEV2023. This is about maintaining current ambitions and removing obstacles to rapid implementation, including at European level.

The KEV2023 expects final energy consumption from 1.566 to 1.818 petajoules in 2030. This means that the increased target of 1.609 petajoules is within the range of the estimate, but requires additional commitment. The climate plans set out in the Spring Package contribute to saving final energy consumption by promoting (hybrid) heat pumps through the standardisation of heating installations, the18 sustainability of rented dwellings with poor energy labels, the energy saving obligation, the use of energy in mobility, and tailor-made arrangements in industry. The indicative increased primary energy consumption target of 1.935 petajoules in 2030 is still out of reach with primary energy consumption of 1.951 to 2.323 petajoules.

The increased target of cumulative savings for 2021-2030 for the Netherlands is 1.285 petajoules. With the policies included in the KEV2023, cumulative savings of 1.168-1.415 petajoules are expected. The objective is therefore within reach.

1.2 Overview of current policy situation

I Greenhouse gas emissions and the energy system

In 2023, based on preliminary figures, emissions amounted to 150 megaton CO2eq. (including emissions from land use), 34 % below 1990 levels. In 2022, emissions were 31 % below 1990 levels. This largely complies with the so-called Urgenda judgment of the Supreme Court of 2019 to reduce emissions by at least 25 % by the end of 2020 compared to 1990; by a few tenths of percentage points in 2021, and by 2020 percentage points in 1. Greenhouse gas emissions per capita are also declining over a longer period. However, emissions in the Netherlands are still relatively high compared to other EU countries.

On the basis of preliminary figures, CO2emissions decreased by around 2 023 megatons between 40 and 1990, a large part after 2016. This is largely due to the closure of coal-fired power plants and an increase in the generation of energy from renewable sources. In 2022, the decline was mainly due to high natural gas prices. These have led to a significant reduction in natural gas use in industry, built environment and agriculture. Non-CO2 emissions have long seen a decreasing trend.

According to Eurostat, total primary energy consumption in 2022 was 2.348 petajoules, 16 % lower than 2.803 petajoules in 2000. The Netherlands' energy mix consists of oil, natural gas, coal, renewable energy and other energy carriers (nuclear and waste). Since 2000, natural gas consumption has decreased by 33 % until 2022. Coal consumption increased by 20 % between 2000 and 2017 with the entry into operation of three new coal-fired power stations and due to developments in the price of natural gas and coal, but fell sharply in the period thereafter, reaching a level 28 % lower in 2022 than in 2000. Oil consumption has been relatively stable since 2000 – despite an increase in GDP. In 2022, oil consumption was 12 % lower.

The share of renewable energy according to the European Renewable Energy Directive has increased from 1.6 % to 15 % in 2000 since 2022. In particular, the production of renewable electricity from wind and solar has been growing rapidly in recent years. In 2022, gross normalised domestic production of renewable electricity accounted for 40 % of electricity consumption, with which the Netherlands developed from the European backguard to the hidden.
The share of renewable heat in total final energy consumption for heat has slowly increased since 2000 to 8.8 % in 2022. The share of renewable energy for transport based on physical renewable energy consumption has increased since 2005 to 11 % in 2022.

Final energy consumption in the Netherlands decreased by 17 % between 2000 and 2022, from 2.181 petajoules to

18The Main Line Agreement is expected to change this policy. For more information, see the box on the main lines agreement in chapter 1 of the INEK.

1.819 petajoules, although there was an increase in final use between 2000 and 2010. Most energy is used by heating buildings, followed by industry, mobility and glasshouse horticulture. Energy consumption has been declining since 2010, especially for households where energy consumption has decreased by 21 % since 2000.

The Netherlands has substantial natural gas reserves which have been extracted on a large scale since the 70s, both to meet domestic gas demand and to export. As a result of the decision in 2018 to completely phase out gas extraction from the Groningen field, the Netherlands has since been a net importer of natural gas. The Netherlands is one of the largest importers of crude oil in the EU. Half of the imports are directly exported to other countries such as Germany and Belgium. The other half is consumed by refineries in the Netherlands, which have an international (mainly European) outlet. In the Netherlands coal mining has been shut down since the 70s and therefore depends entirely on imports for coal. Domestic electricity production capacity in the Netherlands increased from almost 21 megawatts in 2000 to 54 megawatts in 2022.

Many parties are active in the Dutch energy market. For the supply of gas and electricity, there are producers and suppliers operating on the market. The management of the networks is carried out by public independent network operators. The Netherlands has split the energy companies, with network operators operating independently and financially.

Developments abroad tend to have a major impact on the Netherlands. For example, the Russian invasion of Ukraine resulted in an unprecedented increase in energy prices, bringing fuel prices to historically high levels in 2022. Russia has overwhelmingly closed the gas crane to the EU. The EU aims to phase out its dependence on Russian energy as soon as possible and has adopted import boycotts on coal and oil from Russia.

In the longer term, the Netherlands is expected to be net exporter on an annual basis. After forty years of continuous net exports of electricity in 2020, the Netherlands exported for the first time net of 2.7 TWh of electricity, this was close to balance in 2021, but on the basis of preliminary CBS figures, the trend continued in 2022 and 2023 with net exports of residual 4.3 TWh and 5.7 TWh. This is due, inter alia, to the withdrawal of nuclear power plants in Germany and Belgium and the reduction of the capacity of coal and lignite power plants in Germany. Imports and exports will increase significantly due to strong growth in wind and solar energy production capacity. Increasing the link with the rest of the world makes it possible to absorb fluctuations in the production of electricity from the sun and wind.

II Policy Context of the Plan

The Dutch economy grew by 0.1 % in 2023, adjusted for price changes (CBS, 2024a).
This was much less than in 2021 and 2022, when the economy recovered sharply from the coronavirus pandemic with growth of 6,2 and 4.3 % respectively in 2020. Two consecutive years with these growth rates had not yet occurred this century. The modest growth in 2023 was accompanied by high inflation and higher interest rates. Furthermore, the volume of world trade was lower than in 2022. The value of GDP exceeded EUR 2 023 trillion for the first time in 1. In 2002, GDP exceeded EUR 500 billion. The value of GDP doubled from half a trillion to 1 trillion in 21 years. By comparison, the Dutch population grew by almost 11 % over that period and the number of hours worked by about 19 percent. In the ranking of the world's largest economies in 2023, based on estimates from the International Monetary Fund, the Netherlands ranked eighteenth, with a GDP of around USD 1.1 trillion.

The Netherlands is a densely populated country with 525 inhabitants per km². At the end of 2023, the population was 17.9 million. The population is expected to increase to 18.5 million in 2030 and to grow further to 19.2 million in 2040, due to immigration. For the energy consumption of consumers, the number of households is more determinative than the size of the population. The average size of a household has been declining for decades and this trend continues in the future. The growth of the number of households is therefore higher than the growth of the population.

The measures taken during the coronavirus crisis resulted in a sharp drop in energy consumption and emissions. Most activities are almost back to pre-COVID levels, but some changes seem structural (such as working from home). The economy has also recovered rapidly after the coronavirus crisis. The demand for fossil fuels has risen sharply again in the course of 2021, as compared to previous years, with the reduction of the coronavirus measures.

In addition to climate ambition, the earthquake problem in Groningen is also a major determinant of climate and energy policy. This earthquake has led to the decision that gas extraction from the Groningerveld was completed after 60 years with effect from 1 October 2023 for the safety of residents. As of 19 April 2024, the Groningen field was definitively closed.

The annual Monitor Brede Welvaart – Sustainable Development Goals shows that the quality of life in the Netherlands is relatively positive across the breadth.19 There is a positive development, for example, in the field of work and leisure. However, in terms of natural capital, the situation is worsening over a longer period for biodiversity and water in particular. For example, freshwater, marsh and land fauna continue to decline, while other biodiversity indicators such as urban birds and farmland birds also fall over a longer period of time.

On nitrogen, nitrogen exceedance was lower in 2020 (62.4 % of nature, 6 pps less than in 2018). The exceedance of critical nitrogen deposition values over the longer term of 25 years is decreasing (compared to 1995). Despite these positive developments, the absolute environmental pressure of nitrogen remains one of the highest in Europe. The government is taking various sectoral measures to reduce nitrogen emissions. Efforts are also being made to unblock nitrogen licensing in order to accelerate the realisation of energy infrastructure.

Climate concerns are widespread, about six out of ten Dutch people are concerned about climate change,[20] half of Dutch people are positive about (more) action by the government to combat climate change, while 14 % are negative. Around half are in favour of public financial measures – rewarding climate-friendly behaviour and pricing polluting behaviour – to combat climate change. Almost four out of ten Dutch nationals are (very) motivated to make climate-friendly choices. The motivation has slightly increased compared to 2021. A small majority think it could contribute to sustainability. Dutch people also know more often than in 2021 what they can do to combat climate change.

While sustainable policies can contribute to broad prosperity, they can also have a negative impact on citizens' bestsecurity and increase social inequalities. A majority of people perceive the distribution of the costs of climate action as unfair, 83 %. In particular, people feel that large companies are still not doing enough. A majority also sees the distribution of costs between poor and wealthy citizens as unfair (76 %). A broad climate consultation shows that it is important for citizens to take painful measures that the public authorities first (1) do enough to contribute to the largest polluters, that (2) low incomes are adequately protected and that (3) the gap between poor and rich does not widen by action. For citizens, civil society organisations and businesses to contribute to climate change, the "polluter pays" policy principle is found to be the most just.

III Description of current policies and measures

The Dutch climate and energy policy is shaped by "climate sector".20 The policy commitment by sector is set out below. The policy is described in more detail in Chapter 3. The 2023 Spring decision-making process set out a number of key policy principles: Dutch climate policy is just, implementable and ambitious.

- *Just:* As the transition is ongoing and is becoming more concrete for citizens, businesses and civil society organisations, climate policy is also becoming more and more attentive. As indicated by the Scientific Council for Government Policies, the transition may be delayed if it is not seen as just. Justice can be looked at in a variety of ways, including procedural justice and distributive justice. Where the first is about the processes – who is involved in decision-making and how transparent is decision-making – the second is about the outcome of those processes – how are the burden and benefits of policies divided? Chapter 3 explains the implementation of equity in climate policy.
- *Implementable:* With the pace we have to make, we are looking for the limits of what is feasible until 2030. Because of the need to catch up tensions, is the necessary infrastructure ready in time? Are there enough skilled people to do the job? Can the Cabinet and Chambers take sufficient account of the extensive legislative programme? We already see that it is sometimes pieped and cracked. This cannot be a reason to scale down measures and ambitions due to the urgency of the climate challenge. Instead, we focus on targeted solutions that make every effort to speed up the implementation of policies. Chapter 3 lists some of these implementation solutions.

[20] https://www.rijksoverheid.nl/documenten/rapporten/2024/02/12/publieksmonitor-klimaat-en-energie-2023-motivaction.

- *Ambitious:* The Dutch contribution to a climate-neutral Europe is laid down in the Dutch Climate Law. This also applies to the

19CBS (2023) Monitor Brede Welvaart and Sustainable Development Goals.

20This classification differs from the usual (economic) sector classifications. For example, emissions and energy consumption of mobile tools from all sectors are included in the climate sector mobility. Industrial energy activities (such as gas and oil extraction and oil refining) are allocated to industry. The climate sector electricity also includes emissions and energy consumption from heat production from energy companies.

intermediate target for 2030 of achieving at least a 55 % domestic reduction in greenhouse gases. We are pushing for a reduction of around 60 %, and we focus on "over-programming" of measures. This, together with the elaboration of the Coalition Agreement as laid down in the Climate Policy Programme, expects the ambition of at least 55 % reduction to be reached.

The policy aims to further reduce greenhouse gas emissions. This is done by providing a perspective for new technologies such as the deployment of green hydrogen, wind solar, but also by encouraging the end of technologies that are no longer fit for purpose. This could include the ban from 2030 on using coal for electricity production, requirements for new boilers, stopping the sale of cars for fossil energy, etc. In short, the policy focuses on combining construction and phasing out.

Electricity sector

The sector is working to rapidly roll out renewable electricity and phase out fossil-based production. This preserves the sector and makes an important contribution to the sustainability of the other sectors that are increasingly electrifying. The objective is to have a CO2 free electricity sector by 2035. The Act on the Prohibition of Coal in Electricity Production prohibits the use of coal for electricity production as of 2030. In addition, the ambition of the Netherlands to significantly accelerate the deployment of offshore wind energy has been pursued with the aim of producing 21.000 MW around 2030. Efforts are also being made to accelerate CO2 flexibility,to further scale up the production of CO2 free energy carriers and to prepare for the construction of two new nuclear power plants.21 The Netherlands also in electricity storage by investing in battery innovations and requiring batteries in large-scale solar parks. It also allows solar energy to be used if the sun does not appear and relieves the electricity grid. It also promotes hydrogen production at sea, as well as energy exchange with North Sea countries, allowing long-term storage and exchange of energy.

The challenges surrounding the electricity grid are addressed in the national action programme for network congestion (LAN). Network operators shall carry out investments to speed up the expansion of the grid and use it in a flexible and optimal way. The government makes it legally possible to speed up procedures, and therefore lead times, for energy infrastructure projects.

Industry sector

The industrial sector is facing a huge sustainability challenge. The implementation of the National Programme for the Sustainability of Industry creates a stronger focus on making industry more sustainable, ensuring greater coherence between the various initiatives and strong cooperation in the six industrial clusters. The pricing of emissions through the European Emissions Trading System (ETS) and the national CO2levy encourages Dutch industry to contribute to the sustainability challenge. The national CO2levy ensures the sectoral emission reduction by law. In addition, the government encourages investments in sustainability through subsidies for innovation, scaling up and deployment of emission reduction, energy saving and circularity techniques.

Built Environment Sector

In order to contribute to the fight against climate change, the objective is that the built environment is CO 2050 neutral by2. This is why we reduce energy demand by improving the insulation of buildings and move gradually towards 2050 from natural gas to alternative and energy efficient heat and cold supply, based on renewable energy. The policy follows two interacting tracks. An area-based track where local districts, under the control of municipalities, are planned to be preserved and eventually made free of natural gas. And a second track targeting individual buildings and building owners. This is described in the Programme for the acceleration of the sustainability of the environment (PVGO).

Agriculture and Land Use Sector

Improving the sustainability of agriculture and land use is crucial to achieve climate neutrality for the Netherlands by 2050. Future-proof sustainability requires an integrated approach to address multiple challenges (such as climate, nature, nitrogen and water quality) in a coherent manner. For the rural area, the integrated approach is set out in the National Programme for Rural Areas (NPLG). The approach in the NPLG focuses on livestock farming, arable farming and land use. Glasshouse horticulture policy follows a separate track. With the glasshouse horticulture sector, the government has signed a memorandum of understanding on further sustainability towards a climate-neutral greenhouse horticulture sector in 2040.

Mobility Sector

The mobility sector is moving towards a climate-neutral and fossil-free mobility system by 2050. This includes 'zero-emission

21The **Main Line Agreement** is expected to change this policy. For more information, see the box on the Main Line Agreement in Chapter 1 of the INEK.

tailpipe' for passenger transport, freight transport and mobility in construction. This will not only address climate change but also significantly reduce environmental damage in other areas. Zero-emission mobility requires a comprehensive recharging and refuelling infrastructure for zero emission vehicles. Where internal combustion engines are still unavoidable, renewable fuels are used to replace fossil fuels. For 2030, concrete targets have been set for improving the sustainability of passenger mobility, the switch to electric transport, the use of sustainable energy carriers and the increase of zero-emission transport in logistics. Aviation and shipping policies are being developed in view of the global scene and the longer term.

Sector overwhelming policies

In addition to the sectoral approach, generic instruments such as energy taxation, energy saving subsidies, (Energy investment deduction (EIA)) and renewable energy and CO2reduction (SDE + +) are also used.
The combination of subsidies and levies is widely applied to encourage desired behaviour and discourage unwanted behaviour. In addition, Mission-driven Research, Development and Innovation (MOOI), SME innovation stimulation Regio and Top Sectors (MIT) and the Environmental Investment Deduction (MIA)/Willequely Depreciation Environmental Investments (Vamil) are also important subsidy instruments with a wide scope across different sectors.

In addition, the Netherlands has adopted a National Energy System Plan (NPE) 2050, which sets out an integrated vision for the transition of the different sectors and energy carriers. For the spatial planning of energy infrastructure of national importance towards 2050, the Netherlands is implementing the adopted Energy Main Structure Programme (PEH). To avoid shortages of professionals leading to delays in implementation, the government has recently launched a Green and Digital Jobs Action Plan.

More information on these instruments and programmes can be found in Chapter 3. It also addresses a number of cross-cutting issues such as justice (social and procedural), the Social Climate Fund, the Just Transition Fund (JTF), labour market and spatial frameworks.

IV Key aspects of cross-border interest

Due to the open economy and its orientation towards international trade, developments abroad, in particular in neighbouring countries, tend to have a significant impact on the Netherlands. For example, large quantities of crude oil are traded and processed through the world market for further transit. Gas and electricity infrastructure and markets have also been closely connected with other European countries, partly due to the strategic ligning. Cooperation with other countries is of great importance for the Netherlands. Therefore, the Netherlands is working with other EU Member States to ensure that climate and energy targets, legislation and policies are designed in a way that is in line with climate neutrality by 2050. This is also used by the Netherlands in a global context. In addition, by working together with European countries, we can avoid carbon leakage from greenhouse gas reductions and major competitive disadvantages for the Dutch economy.

We can also set common standards and standardise in a European or regional context that contributes to the achievement of energy and climate goals. For example, the European CO2standards for vehicles (cars, vans and trucks) are of great importance in reducing CO2emissions from new vehicles. The Netherlands is working intensively with like-minded Member States in the negotiations for CO2standards for heavy-duty vehicles to ensure strong EU standardisation. The same applies to sharp EU standardisation for non-road mobile machinery (e.g. excavators, cranes, boat engines).

Depending on the common challenges and interests, different topics may vary. It connects with existing energy, industrial and climate partnerships (such as Pentalateral)

Energy Forum and North Sea Energy Cooperation (NSEC)) and seeks cooperation in the fields of agriculture, mobility, circular economy and built environment with like-minded countries. For example, in order to implement the EU Directive on the construction of alternative fuels infrastructure (AFIR), the Netherlands, together with Germany, has set up an informal cooperation agreement involving some ten European Member States. In addition, the Netherlands is working on the deployment of alternative fuels for mobility in Benelux. Cooperation is also underway with neighbouring countries to enable electric and inter-country driving. This concerns the standardisation of protocols and charging infrastructure.

V Administrative structure of national energy and climate policies

Government level governance based on the Climate Act

In accordance with the Climate Law, the Coordinating Minister for Climate and Energy, hosted by the Ministry of Economic Affairs and Climate Policy, bears the (end) responsibility for the target scope of the targets in the Climate Law and the Planning

and Accountability Cycle (Climate Plan, Climate Paper).

The specialist ministers are responsible for achieving the sectoral share of climate policy. The coordinating Minister for Climate and Energy shall regularly (at least four times a year) speak to specialist ministers on the progress of policy implementation. The Minister for Housing and Spatial Planning, hosted by the BZK, is responsible for the Sectoral Declaration on Builded Environment; the Minister for Infrastructure and Water Management for the mobility sector; the Minister for Economic Affairs and Climate Policy for the Industry Sector Declaration; the Minister for Agriculture, Nature and Food Quality and the Minister for Nature and Product for the Agricultural and Land Sector Details. The Minister for Climate and Energy is responsible for the electricity sector and energy policy.

The Planbureau voor de Leefomgeving (PBL) is an independent accounting officer in terms of living, environmental, climate and energy. Each year, the PBL publishes the Climate and Energy Outlook (KEV). The KEV, which is the successor to the former National Energy Outlook (NEV), provides an overview of realised emissions and an estimate of greenhouse gas emissions in the Netherlands on the basis of the current climate and energy policy, broken down by sectors. The KEV shall be sent to both Houses of the States-General by 1 November each year.

The Climate Law requires the government to report periodically on the achievement of the objectives set out in the law. The Council of State advises annually on the Climate Paper and 5-yearly on the Climate Plan. At the same time as the KEV, the Cabinet sends the Climate Note to both Houses of the States-General. The Climate Paper contains: A. the overall picture of the implementation of climate policy as set out in the Climate Plan;
b. a presentation by ministry of the main aspects of climate policy implementation;
c. a presentation of the impact on departmental budgets of climate policy;
d. the financial impact on households, businesses and governments of significant developments in climate policy deviating from the climate plan;
e. how climate and energy recognition is involved in the next review or review of the progress of the Climate Plan; and
f. where relevant, reporting on progress on the implementation of the climate plan.

Every five years, a review of the policy for which a strategic review of the agenda has been prepared by EZK will take place. The monitoring, evaluation and updating of the National Energy System Plan will follow the existing climate policy cycle as laid down in the Climate Law. There will be an annual Energy Paper in addition to the Climate Paper and a five-yearly cycle of review and update. Two (complementary) evaluations were completed in spring 2024: a synthesis study on the efficiency and effectiveness of climate policy, and a lesson assessment of climate policy (LEKB), carried out by PBL on how current governance and commitment to climate policy contributes to societal transformation towards climate neutrality by 2050.22

The Climate Plan sets out climate policy for the next 10 years to achieve the objectives of the Climate Law. The national assurance cycle in accordance with the Climate Law takes into account the INEK cycle.

The Climate Act requires the Climate Plan to be readopted every five years. The Climate Plan was based on the Dutch Climate Agreement in 2019. The Climate Plan was updated in 2022 with the new Cabinet's Policy Programme. The new Climate Plan for the period 2025-2035 is currently under preparation and will be presented to the House of Representatives in 2024. The Climate Plan addresses not only the concrete policy agenda 2025-2035 but also the long-term strategy towards climate neutrality by 2050.

The Climate Plan is organised according to the five climate sectors that together are responsible for emissions on Dutch territory: electricity, industry, built environment, mobility and agriculture and land use. In addition, the Climate Plan focuses on cross-cutting policy agendas, such as the (spatial integration of) energy system, hydrogen, bio-raw materials, innovation, labour market and training, funding and citizen participation.The climate plan policy (and subsequent updates) also touches upon the five dimensions of the Energy Union (decarbonisation, energy efficiency, energy security, internal energy market, and research and innovation).

Scientific Climate Council

An independent Scientific Advisory Board (WKR) has been established to advise the government on climate policy. It has been operational since April 2023. The ERR has a multidisciplinary composition and is composed of up to 10 members, including a Chair. The Advisory Board is an independent scientific advisory body that provides requested and unsolicited advice to the

22 Kamerbrief op Rijksoverheid.nl: Government response to evaluation study and overview of climate policy | Parliamentary document | Rijksoverheid.nl.

government and parliament on the basis of scientific knowledge on the climate policy to be implemented. In December 2023, they delivered their first opinion on the new Climate Plan in 2024. In April 2024, the Cabinet sent a reply to the Lower House of Representatives.23

1.3 stakeholder consultation and involvement

I Involvement of the national parliament

See point 1.2.V (administrative structure) on accountability to the House of Representatives.

II Involvement of local and regional authorities

Inter-administrative cooperation

Co-governments have an important role to play in the energy transition, including through their mandate and responsibility in environmental policy. The central government and co-governments need each other in order to be able to deliver. Administrative arrangements have been reached between the Government, the Interprovincial Consultations (IPO) and the Association of Netherlands Municipalities (VNG), following the development of the Coalition Agreement in the Climate Policy Programme, on cooperation by sector (through national programmes), and on the availability of sufficient means of implementation.

In order to keep track of the progress of the agreements, at least four times a year an Administrative Consultation on Climate and Energy (CC) will be organised under the chairmanship of the Minister for Climate and Energy.

Regional Energy Strategies (RES)

In the 30 energy regions in the Netherlands, governments, residents, industry, grid operators, energy cooperatives and civil society organisations work together on the Regional Energy Strategies: the RES.

In many cases, the region is the right level of scale to link the challenge of the energy transition with other challenges in the physical environment, thus balancing interests. The matching of electricity and heat supply and demand, and the spatial weighting of renewable energy and heat generation cannot be addressed by a single level of government. The RES provides a tool whereby municipalities, provinces and water boards work together at a regional level to make integrated reflections on renewable electricity generation, the heat transition in the built environment and the necessary storage and infrastructure. They do so together with network operators, businesses and social stakeholders. The focus is on realising the generation of at least 35 terawatt hours of renewable energy on land in 2030 and developing a regional structure for heat. The RES were given preferred directions in line with the balancing principles set out in the draft National Environmental Vision. The first offer made by RES regions totals 55 terawatt hours.

The RES has been established by the municipal councils, provincial authorities and the general authorities of the water boards. Representatives and daily directors are usually taken into account from the start of the RES process. The way in which this has been done varies from one region to another.

The implementation of the RES is supported by the Inter-Administrative National Programme for RES (NP RES). The NP RES has five clients: the Ministry of the Interior and Kingdom Relations, Ministry of Economic Affairs and Climate Policy, the IPO, the VNG and the Union of Water Boards. The NP RES provides a platform for learning and tailoring, supporting the target regions and developing a solid and socially owned process for this purpose. In this light, parties such as network operators and the participation coalition are also actively involved.

The RES regions continue to implement the RES 1.0. Every two years, a progress document is drawn up by the RES regions, detailing the state of play in their own RES region. In addition, part of the regions are re-calibrated RES 2.0 based on insights from implementation, innovations and progressive understanding towards the target in 2030 and beyond.

23Parliamentary paper 32813, No 1384.

Mobility: MIRT

The Multiannual Programme for Infrastructure Space and Transport (MIRT) contains the national projects and programmes, which are working on the accessibility, safety and spatial planning of the Netherlands. The projects and programmes are (mainly) financed by the Mobility Fund (MF) and the Delta Fund (DF). Every year there is administrative dialogue between the central government and local authorities (provinces, municipalities, transport regions, water boards) in each of the five MIRT regions (north-west, south-west, south, east and north) and for the freight transport corridors programme, in which investment decisions are taken on the basis of jointly identified challenges.

III Involvement of stakeholders, civil society and the public

Citizens' engagement and forum

The climate challenge and the changes in the energy supply needed to do so have a major impact on the living environment, daily life and the wallet of Dutch people. Empowering residents for their own initiative and involving them in public initiatives can better take their concerns, wishes, experiences and preferences into account at all stages of policy-making. This is already happening in many places. Together with co-governments, civil society organisations and citizens, the KabinetsVision for Citizens' Engagement in the Energy Transition was published on 17 May 2023.[25] Vision sets out three priorities, first lines of action and ten principles, to properly organise citizen engagement on the energy challenge. Two examples of the principles for participation in climate and energy policies are to ensure that all citizens – including hard-to-reach groups – can participate equally, and that participants are well reflective of the population in the neighbourhood. The government will work together with other parties in the coming period to further involve residents of the Netherlands and those living near larger energy projects in the energy transition and to give them more space to think and do so.

One way of involving citizens at national level is a National Citizens' Forum on Climate Policy, established in July 2023. Within this Citizens' Forum, a faithful group of citizens, who is as representative and diverse as possible, informed about the following question: "How can we like the Netherlands eat, use goods and travel in a way that is better for the climate?". At the end, the Citizens' Forum draws up an opinion to the Cabinet. Good cooperation between Parliament and the Cabinet is essential for the design and follow-up of a citizens' forum. The Cabinet and the House of Representatives have both committed themselves to follow up on the opinions of the Citizens' Forum. The Cabinet responds to the opinions in which they support, for each opinion, what is being done with the opinion. The House of Representatives will discuss the opinion of the Citizens' Forum and the Government's response to it. With the entry into office of the new House of Representatives, the Cabinet invited the House to jointly address the process of the Citizens' Forum. It will be considered when the Citizens' Forum could start.

In August 2023, the new public campaign "Save the button" started. This campaign integrates Dutch society at three levels into the climate and energy transition. We explain what governments, businesses and citizens can all do, what they perceive the transition and how it takes shape.

1. The 'why' and 'how'. We tell us what is happening and why we need to act. This is an important element in the public campaign because stakeholders need to be able to fall back on it. In addition to explaining why we are implementing this transition, we also tell us how we will do so. How the landscape is changing, what people will perceive it in their immediate environment.
2. At domain level, we are talking about how the transition is taking place. We will travel, live differently, use energy, consume and eat differently. This is done in close cooperation with other departments. Their public campaigns are linked to the national campaign.
3. Providing a concrete perspective for action. In this context, the government cooperates with the other departments, regions, municipalities and other relevant stakeholders. It outlines what citizens, civil society organisations/institutions and businesses can do concretely to contribute to the climate and energy transition.

The National Climate Week takes place every year. We want to encourage behavioural change by making the movement from society towards a sustainable Netherlands fully visible and inspiring Dutch people to take additional steps. We do this by showcasing sustainable initiatives by citizens, civil society organisations/institutions and businesses and public authorities. We adopt a local approach with climate mayors

(citizens involved) and climate supporters (relevant institutions such as businesses, associations and foundations) with a strong role for the facilitating role of municipalities. The message is that we can get it together together.

From science, we also hear the call for other types of research programmes for the climate policy phase we are now in. The Netherlands aims to involve citizens and science as much as possible in policy development. Independent scientists from various

[25] parliamentary Document 32813, No 1231.

Dutch universities and research institutes are consulted for the Climate Plan. When developing the Climate Plan, we are also working on different scenarios, for example in this Climate Plan we also look at “setbacks”, in case the climate targets are (at risk) become apparent. We are also thinking about the economy of the future.

At the end of 2023, an internet consultation on the Climate Plan Contourenbrief and the draft update INEK was open to any Dutch national or civil society organisation. A total of 82 views were submitted, but some of them concerned several topics. The view gives a broad picture of how citizens, businesses and others, individually or organised, perceive the Climate Plan and INEK. The topics most frequently reflected in the views concerned: Coherence between transitions, scientific insights, equity and carbon removals, but also include many other topics.

The coherence between the different transitions was regularly reflected in different views. Mainly the link between the climate transition and nature and biodiversity. Many people express concern and stress the importance of focusing on nature and biodiversity globally, but also in shaping our national climate policies.

Some petitioners are not yet convinced of the scientific basis for the climate problem and do not believe that human responsibility lies with it. Nor do they see how the Dutch share of the global transition can make a significant contribution.

Fairness and a just transition in the Netherlands, and globally, are also important issues in a lot of views. Making sure that everyone contributes, that policies remain affordable, and the impact on policies are repeated on several occasions and are also highlighted in the consultation report.

Carbon removal is also a subject mentioned in this consultation. The consultation report therefore looks at the different carbon removal techniques and their deployment, which have been raised in some of the views.

The consultation report describes how the statements, questions and opinions and suggestions from the different views have been incorporated into the INEK and will feed into (the process of the) Climate Plan, see https://www.internetconsultatie.nl/contourenklimaatplan.

National Climate Platform

A National Climate Platform (NKP) has been established to strengthen the ambitious public plans for the climate and energy transition, with insights from the life of citizens and entrepreneurs (SMEs) in particular, thus promoting the desired acceleration. The Platform aims to increase ownership and ownership of climate policies, especially among those groups that are more difficult to reach. The added value of the NRP lies in systematically collecting, analysing and placing on the agenda opportunities and bottlenecks experienced by citizens and entrepreneurs in the everyday life of the climate and energy transition. The platform reports three times a year on these opportunities and bottlenecks to the Minister for Climate and Energy.

This platform is chaired independently and is a follow-up to the governance of the Climate Agreement that has lapsed with the new Cabinet. The NRP is positioned as an independent platform for 4 years.

Participation in RES

In the regions, public authorities work with grid operators and social stakeholders on regionally informed choices for renewable electricity generation, the heat transition in the built environment and the necessary storage and energy infrastructure. These choices have been and are translated into areas, projects and their implementation and implementation.

A RES 1.0 has been established in each region. This was preceded by an initial document which also sets out the objective and means of democratic and spatial assurance. The process has resulted in an offer per region in which concrete search areas could be suitable for energy from sun, wind, soil or water, taking into account spatial quality and public acceptance.

Process participation in RES leads to better-informed choices and decisions and is important for successful implementation. For each region, municipalities, water board and province provide proper and timely information to citizens and provide local facilities to enable citizens to participate more effectively in the implementation of the RES. It is up to the region to decide what kind of facilitation is needed.

When implementing the RES, regional authorities are bound by the agreements on project participation in renewable energy generation laid down in the Climate Agreement.

In many regions, 50 % of local ownership is being developed. Regions are involved in various ways: from the development of guidelines for developers to the establishment of a regional public Development Company.

Energy System Outlook Expert Team

The Independent Energy System Expert Team (ETES) 2050, commissioned by the Cabinet, published an Outlook on the long-term development of the energy system, which was one of the building blocks underpinning the National Energy System Plan (NPE).[26] The NPE was adopted by the Cabinet in December 2023.27

National Energy Consultation

Achieving climate neutrality by 2050 requires a change in our energy system. However, this transition to a new energy system constantly entails new choices and dilemmas.
In preparation for the drafting of the NPE and with the aim of aligning decision-making in the energy transition as closely as possible to the preferences of the Dutch population, the Dutch government organised a national consultation. In the framework of the Energy Consultation of 2023, all Dutch nationals were given the opportunity to advise the cabinet and express their views. A survey asked participants to choose from ten values that can be taken into account in the energy transition, a so-called Participative Value Evaluation. These included questions such as the degree of dependence on foreign energy supplies and the preservation of our living environment. In addition, the main elements related to the development of new nuclear power plants were specifically asked. Participants have extended the opportunity to motivate and qualify their choices. The results of this consultation will feed into the formulation of policies for our energy system in 2050. The main conclusions of this consultation are summarised below:

- **Security of supply** is very important for participants. This is demonstrated in particular by the fact that the average participant in the target "The Netherlands must be as dependent as little as possible on the rest of the world/Europe for its energy" gives the most points. This high level of prioritisation is consistent for almost all groups of participants (varying for example in age and political preferences).
- **Maintaining the status quo is less important** for the participants in the Energy Consultation. Three goals related to maintaining the status quo score relatively low in the Energy Consultation.
- The**energy transition should not be too costly**, and **capital rich people pay the most** to the transition. Fairness and affordability (especially for less capitalised people) are two important public interests for the energy transition.

[26]energy system Outlook 2050 | Expert Team Energy System 2050 (etes2050.nl).

- Another highly prioritised goal is **citizen engagement**: citizens should be involved as much as possible in choices about the design of the future energy system. The attitudes of residents to various forms of participation were also sought. This leads to the following insights:
  - In general, people are enthusiastic about participation, the majority say they are likely to come to a chance of participation (or to an active or passive form).

27Parliamentary paper 32813, No 1319.

- Where participants should come physically, such as meeting or citizens' forum, the municipal level is preferable to the national level.
- Passive methods (survey and referendum) receive a stronger enthusiasm than the active methods with a lot of time investment (meeting and citizens' forum).
- Citizens who participate more often tend to be enthusiastic about civic participation.

In addition to the Citizens' Energy Consultation, there have been additional forms of participation in the preparation of the National Energy System (NPE) during 2023. Parts of the draft NPE have been discussed and strengthened in a series of nation-wide meetings for co-governments, market players, industry associations, energy cooperatives and citizens. Through a digital one-stop shop, the draft NPE was also available for consultation from July 2023 to October 2023 and was open to everyone to respond. These comments have been incorporated into the final NPE.

IV Consultation and coordination with other Member States

Dutch energy and climate policy is regularly shared with other Member States through various consultation fora and regular coordination with other Member States takes place. Cooperation will also be sought in the fields of agriculture, mobility, circular economy and built environment with like-minded countries. In the fields of energy, industry and climate, links to existing partnerships, such as the Pentalateral Energy Forum, the Green Growth Group, the North Seas Energy Cooperation (NSEC), the Greater North Sea Basin Initiative (GNSBI) and various European working groups.

The Pentalateral Energy Forum was co-launched by the Netherlands in 2005 with first Benelux, France and Germany as members, and later Austria and Switzerland. The Benelux provides the secretariat and rotates the presidency. Ministers gave political guidance to the Penta-countries' regional cooperation, focusing on market coupling, security of supply and improving flexibility services. Ministers meet every two years. The Penta cooperation is explained in more detail in section 1.4.

With the Netherlands and the European Commission, Belgium, Luxembourg, Germany, France, Denmark, Ireland, Sweden and Norway have signed the North Sea Declaration for the development of offshore wind energy and improvements to the offshore electricity grid, including interconnectedness. For example, synergies can be exploited, such as joint interconnection and connection projects to offshore wind farms. NSEC's agreements are summarised below in this chapter (Section 1.4). In addition, the Netherlands and France launched the GNSBI in early 2023. The aim is to strengthen integrated cooperation between the North Sea countries on the energy transition, but also on nature protection, sustainable food production and transport.

The Green Growth Group (GGG) is composed of 17 EU Member States (Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal, Slovenia, Spain, Sweden) plus Norway working together to strengthen the EU's climate ambition.

Bilateral consultations with neighbouring countries are also taking place. This includes issues such as the phasing out of natural gas (low calorific), coal phase-out, greenhouse gas reduction measures, knowledge sharing and cooperation on hydrogen and CCS, and the impact of capacity market mechanisms. Government consultations also take place regularly in the field of climate energy with Germany, France and Belgium.

V Iterative process with the European Commission

Consultation with the European Commission takes place in the regular Working Groups under the Climate Change Committee, the Energy Union Committee, the National Energy and Climate Plan (NECP) online platform and the Energy and Climate Council Working Groups. In addition, bilateral consultations with staff from the European Commission's Directorate-General for Energy (DG ENER) and the European Commission's Directorate-General for Climate Action (DG CLIMA) took place towards the final INEK update.

1.4 regional cooperation in the preparation of the plan

I Elements subject to a joint or coordinated planning process with other Member States

Several dialogue meetings were organised in Pentalateraal (the Netherlands, Belgium, Luxembourg, Germany, France, Austria and Switzerland) to discuss how we will prepare our INEKs together and where we will coordinate them. This resulted in a political declaration signed at the Energy Council in February 2019. With this declaration, the countries express the view that the Pentalateral Forum will focus on enhanced regional cooperation in the framework of the INEKs. In 2023, the Penta ministers once again included a joint paragraph in the new concept of INEKs. Section 1.4.II of this INEK contains a joint English chapter in accordance with this declaration.

It has been agreed with the North Seas Energy Cooperation (NSEC) countries to attach a joint North Sea paragraph to INEK. This text is also to be found under 1.4.II.

II explanation of how the results of that regional cooperation have been taken into account in the plan

The results of regional cooperation are included in the Common PENTA chapter for NECPs, the Common NSEC chapter for NECPs and in section 5.5.

Common PENTA Chapter FOR NECPs

Pentalateral Energy Forum – The platform for regional energy cooperation

The Pentalateral Energy Forum (Penta) is a voluntary regional cooperation since 2005 between Belgium, France, Germany, Luxembourg, the Netherlands and, since 2011, Austria, counting for more than 40 % of EU population and covering more than 50 % of the electricity generation in the EU. Switzerland joined as a permanent observer in 2011 and contributions Actively to the technical work and decision shaping. In close cooperation with the European Commission (on invitation), the Pentalateral Energy Forum facilitating the cooperation between all relevant parties in order to contribute to a suitable, decarbonised and efficient electricity system that is based on integrated and well-functioning markets. As the electricity sector plays a critical role in the decarbonisation of our societies as a whole by 2050 the latest, Penta countries aim to further increase the share of renewable energies and to fully decarbonise their electricity system as soon as possible and ideally by 2035.

The cooperation is led by the ministers responsible for energy policy, who meets on a regular basis. The follow-up of the activities is concentrated by the Penta Schneider under the direction of the respective Directors General of the Penta countries. The work programme is carried out by Ministries, Transmission System Operators (TSOs), Distribution system operators (DSOs), regulatory authorities (NRAs) and market parties who meet on a regular basis in currently four thematic Support Groups. In order for each Support Group to deliver on its race, the exchange between and within Support Groups is strongest encouraged and overseen at the Penta Schneider' level. The Support Groups also liaise with other international fora, such as for example the North Seas Energy Cooperation.

As the transition to a decarbonised energy system gathers pace, countries having increasingly interdependent and regional cooperation needs to address the challenges that arise. The Pentalateral Energy Forum is well placed to address many of these challenges, working for example on security ofsupply, market integration, energy efficiency and decarbonisation. On the past two decades, Penta countries have evolved from a recent national policy perspective on energy markets to the adoption of a regional approach. As a result, Penta countries are ideally placed to contribute to the next phase of the energy transition.

Security of supply

Security of supply has been at the core of the Pentalateral Energy Forum since its establishment. Ever since, countries have been closely cooperating to foster security ofsupply and to prevent, prepare and manage electricity crises in a spirit of solidarity and trust. Notable milestones were achieved through variable regional adequacy assessments, common crisis exercises, and a common framework under the EU Regulation 2019/941 on risk preparedness in the electricity sector.

Today, the work on security of supply is organised within a dedicated Support Group, structured by two main workstreams: resource adequacy assessments on the one hand, and risk preparedness on the other. Future work is planned for the work streams as well as for the interface between them.

Resource adequacy assessments

Regarding resource adequacy assessments, Penta countries will work in concert with European studies performed by ENTSO-E (European Resource Adequacy Assessment, Seasonal Outlooks) to improve alignment and feasibility for Penta countries. Based on the extensive expertise and knowledge in the field, complementary sensitivity analyses could be performed by Penta TSOs with a particular focus on the Penta region and considering regional specificities and cross-border dependencies. Topics worth further regional investigation included:

- The articulation between the national energy system planning, the implementation of the TEN-E regulation and the fast evolution of the European energy system;
- The role of demand side response and other flexibility resources for system adequacy;
- Methodological improvements in resource adequacy assessments;

- The need for increasing grid capacities and for the option of the existing grid;
- Analysis of critical situations and possible countermeasures.

Risk preparedness

Concerning risk preparedness, the objective is to foster the regional cooperation in the Penta region with a view to anticipating, preparing for and managing electricity crises in a spirit of solidarity and transparency and fully respecting the requirements of a competitive internal market for electricity and the operational security procedures of the TSOs. The Penta countries will look for efficiency between all competent entities involved in a crisis management and between European, regional and national levels. As such, work will focus on the implementation of the memorandum of understanding on risk preparedness in the electricity sector signed on 1 December 2021, and more specifically on:

- Analysis and assessment of regional measures, including necessary technical, legal and financial arrangements for their implementation;
- Organisation of regional exercises;
- Revision of relevant regional electricity crisis scenarios for the Penta region in close alignment with ENTSO-E and the Commission regarding applicable methodologies
- Should an electricity crisis happen within Penta, application of the agreed framework.

Interface between resource adequacy assessments and risk preparedness

Complementary to the above, Penta countries will also work at the interface between resource adequacy assessments and risk preparedness. A first step has been performed through the Penta study Methodological immissions of Resource Adequacy Assessment where the differences and overlaps were investigated. Penta will work towards bridging existing gaps between long-term analysis and short term operational planning, technical and political decision-making, as well as between countries. Specifically, Penta intends to assist in the further development of analytical tools and procedures for information exchange and decision-making, closely involving Ministries, TSOs, NRAs, as well as ACER, ENTSO-E, EU DSO and the Regional Security Centers located within the Penta region (i.e. Coreso and TSCNet).

Market integration

The Pentalateral Energy Forum has two decades of experience on market integration questions. During that period, Penta has witnessed and driven large changes to the policy landscape, with notable characteristics being the introduction of flow-based market coupling first within the Penta region, and now in a larger part of continental Europe.

Promoting future proof market design

In recent years, the work on market integration within Penta has widened in terms of focus and in terms of topics of tasks up. Penta ministers have strong placed hydrogen on national and European agendas as a key element for system and market integration. The newly created SG4 is Actively contributing to development of an integrated EU hydrogen market.

The Pentalateral Energy Forum also claims to contribute to the integration of renewable energies and the development of a decarbonised future electricity system, where integrated markets play a critical role. Must this was done through two studies ‘Vision 2050’ and ‘Flexibility’. These studies have been conducted in the context of the Support Group 3 (SG3) on the future electricity system, and will serve as a basis for future work within Penta.

The Vision 2050 report compares national scenarios for decarbonisation, and potential building blocks for a common political vision on the future electricity system. These building blocks outline necessary elements for a future electricity system to develop in an efficient way. Penta countries will further work on the Vision 2050 through drafting a political declaration that containers a shared vision on the future integrated energy system.

To further achieve such a future electricity system, Penta countries recognise the need for a future – proof market design, and will actively exchange on improving and implementing electricity market regulation, including high priority areas where further work is needed. Penta countries will, based on their past experience, work together in raising the welfare concerns associated with taking an integrated and market based approach towards policy questions that may be material. They will also continue to organise technical changes and projects that contribute to the actual implementation of energy policies in the Penta regions.

Flexibility

The Flexibility report provided additional insight into the current and future state of flexibility in the region.

It Outlines the needs and sources of flexibility in 2030/40/50, driven by the integration of buildings, and shows that cooperation can leverage significant synergies between countries, reducing overall flexibility needs.
The report also providing important recommendations on how to promote flexibility across the region and potential measures how to improve the flexibility of market participants. Therefore, Penta countries will:

- Exchange on harmonisation of non-standardised products such as grid services (e.g. redispatch and topological remedial actions).
- Exchange on how to facilitate the contribution of flexible behaviour by market participants to balance the energy system via wholesale markets and to operate the electricity grids in a safe and stable manner.
- Follow development of technical requirements for additional power demand (e.g. heat pumps and other sources of flexibility) to achieve that additional power demand will be flexible.
- Work together in implementing the provisions on flexibility in upstream EU legislation such as the electricity market reform, and the network code on demand side response. Ever possible, Penta countries will aim to ensure the flexibility needs of the region when designing national policy.

Energy efficiency

The Pentalateral Energy Forum recognises the import of increasing energy efficiency as a way to reduce dependence on fossil fuels, and to reduce the scale of the challenge of the energy transition. In that regard, Penta Sees both the value in saving energy, and in flexibilisation of power demand. Penta countries concerned on implementation of the electricity demand reduction obligation that was mandated by EU legislation in the winter of 2022/2023.

Penta countries will continue to work together through Exchanging on the implementation of the revised Energy Efficiency Directive, and will exchange on best practices with regard to energy savings.

Decarbonisation

As articulated above, and based on the previous work on the Vision 2050, Penta countries continuous working towards a common political vision on a decarbonised electricity system, which should be restated as soon as possible and ideally by 2035. Penta countries will work together to further scale up renewable energies and to keep awareness of the import of flexibility in dealing with a fully decarbonised electricity system without losing security of supply. Penta countries fully knowledge and strive for better regional cooperation with the objective to exploit synergies and leverage efficiency gains. Penta countries will explore the added value of additional regional cooperation on renewable integration, grid planning, connecting the offshore to the onshore (in cooperation with the North Seas Energy Cooperation) and in addressing other questions with cross-border impact that may arise in the transition towards a decarbonised electricity system.

Hydrogen

In 2020, a dedicated Support Group on hydrogen was created with the aim to advance the work and close cooperation of Penta in the field of hydrogen. SG4 focuses on the regulatory and market developments in view of hydrogen substitution in the Penta-countries in relation to the national, European and international framework. Based on the political declaration on the role of hydrogen to decarbonise the energy system in Europe signed in 2020 and on recent developments, including REPowerEU and IEA's report entitled 'A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas', the Penta-countries exchange information and defined common positions on the future market design for the developments in view of hydrogen disruption. In particular, SG4 will also continue working on development of hydrogen certification, emerging hydrogen infrastructure in the Penta region and steps taken to develop cross-border

interconnections as well as monitor the progress of the implementation of the Hydrogen strategies of the Penta-countries looking at the development of regulation, Supporting mechanisms, investments, supply- demand developments, trade, amongst others.

Common NSEC Chapter FOR NECPs

North Seas Energy Cooperation – Regional offshore renewable energy cooperation

The Netherlands is part of the wider North Seas region, which has a large renewable energy potential.
The deployment of offshore wind energy will play an increasingly important role in Reaching Europe's energy and climate goals. The EU Offshore Strategy has set the ambition of 300 GW of offshore wind and 40 GW of ocean energy installed capacity by 2050. On 19th January 2023 the North Seas Energy Cooperation (NSEC) has facilitated the development of the non-binding agreement on targets for offshore renewable energy generation in 2050 with intermediate steps in 2040

and 2030 for priority offshore grid corridor Northern Seas offshore grids under the TEN-E Regulation. Targets for the NSOG priority offshore grid corridor constitute 60.3 GW in 2030, between 134,9 and 158 GW in 2040, and between 171,6 and 218 GW in 2050. This means a significant change of scale for the offshore sector, renewable energy deployment and strategic integrated offshore development.
High energy prices, e.g. in 2022, and geopolitical events increasing the European energy system have reduced the requirement of accelerating deployment of domestic renewable energy generation capacities and transmission networks regionally offshore as quickly as possible, thereby significantly improving energy security.

The Netherlands works together with the other NSEC countries on identifying, analysing and realising opportunities for concrete cooperation projects. NSEC is a voluntary, bottom-up, market-oriented, regional cooperation initiative established in 2016, which seks to:

- Creation of synergies;
- Avoid Incompatibilities between national policies;
- Share knowledge on international best practices;
- Foster joint strategies where possible and beneficial.

Ministers responsible for energy regularly measures in the NSEC format. In 2023, NSEC of Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Norway, and Sweden with the participation of the European Commission. On December 18th 2022, NSEC energy ministers and the EU Commissioner for energy signed a Memorandum of Understanding on offshore renewable energy cooperation with the United Kingdom. The establishment of this MoU was provided by the Trade and Cooperation Agreement between the European Union and the United Kingdom of 30 December 2020, built on NSEC, and is distinctive yet complementary to the NSEC framework.

For the offshore wind sector, it is vital to offer a predictable and stable long-term operating environment to facilitate long-term investments and further cost reductions. To this end, existing barriers must be removed and attractive investment conditions should be created. NSEC members work together to make an important contribution to achieving these goals through a regular exchange of expertise focused on cross-cutting topics within the four NSEC Support Groups (SGS):

- SG1: development of hybrid and joint projects;
- SG2: permit, maritime spatial planning and environmental considerations;
- SG3: financing and support frameworks;
- SG4: long term grid and infrastructure planning.

In order for each support group to deliver on its race, the exchange between and within support groups is strongest encouraged and overseen at the NSEC coordinators level. Examples of this are on ports with SG1 and SG4, maritime spatial planning and grid-planning with SG2 and SG4, and how Non-price criteria can strengthen innovation on key challenges for an accelerated, Cost-efficient and responsible removal of offshore wind with SG1, SG3 and SG4. Finally, the support groups also liaise closely with other international fora, such as the Pentalateral Energy Forum and the Clean Industrial Forum in relation to onshore grid planning, market arrangements and stakeholder engagement.

Development of hybrid and joint projects

NSEC's SG1 Serves as a platform to collaborate on concepts for potential offshore wind projects and a coordinated electricity infrastructure, including transmission infrastructure. The group has increased its activity as NSEC countries have started more joint and hybrid projects in the North Seas in order to facilitate technical and ministerial discussions and sharing of best practices as the projects progress.

Management of joint projects on offshore wind, which will be connected and supported by several countries, the support group also works on possible "hybrid" solutions that use cross-border options to connect offshore wind farms to more than one electricity market and potential synergies between countries, as well as the corresponding EU and national market arrangements.

Therefore, the members of SG1 developing opportunities for collaboration on hybrid projects as well as on possible legal, regulatory and commercial barriers. SG1 will continue to work on the barriers and steps for hybrid and joint projects, which can be addressed on the national and regional level. Furthermore, the collaboration will continue to function as a forum to reflect on how to work on issues with legislative processes at the EU and national level.

Permit, maritime spatial planning and environmental considerations

In order to reach our energy and climate targets within the EU, there is a need to accelerate planning and permit procedures at EU and national level, and at the same time better meet the possible ecological limits of extensive scale wind development in the North Seas and the impacts on other users of the sea. SG2 made an inventory of spatial trends of 2030 offshore wind farm developments on a regional sea scale. Next steps are set to better define the ecological trends and potential threats for development and defined spatial strategies to avoid or mitigate such threats. To increase knowledge and support the deployment of offshore wind in the North Seas, the North Seas countries will continue to cooperate closely on maritime spatial planning, environmental research, cumulative impact assessment of wind farms responsible authorities for energy, maritime spatial planning and environment.

Financing and support frameworks

Offshore tenders are a central topic for financing and support frameworks. NSEC members coordinating the offshore tenders by means of sharing information regarding the national tender scales as a part of SG3. In the working group, the countries also exchange best practices concerning tender design, zero-subsidy support, design elements to foster system and sector integration as well as grid connection regimes. To achieve the ambitious goals, joint projects are also more and more important.

For this reason, the group and addressees financing opportunities for joint cross-border offshore projects, including through EU financing instruments such as the Connecting Europe Facility and the Union Renewable Energy Financing Mechanism. Finally, Power Purchase Agreements (PPAs) play an increasingly important role in the financing of offshore projects. The countries will address the issues, barriers and solutions for a wider uptake of PPAs. Further, the group changes on the decommissioning, lifetime extension and repowering of wind farms.

The aim of the changes is also to jointly develop and discuss for the medium term future of the offshore energy system in terms of installed capacity, e.g. through the coordinated tender scales.

Delivery 2050: long-term grid and infrastructure planning

NSECs' SG4 works with ENTSO-E to provide and coordinated input on the Offshore Network Development Plan for the Northern Seas offshore grids under the EU TEN-E regulation. Furthermore, SG4 claims to Broaden the discussion on long-term grid planning to include the early development and update of green offshore hydrogen production and transport, and its potential role in an increasingly interconnected North Seas energy system. Green hydrogen will be important in decarbonising our energy system. Power-to-X, and specifically hydrogen, will play a key role in providing flexibility where and when it is new.

Hydrogen demand is expected to be significant, at least after 2030 due to fall into its potential as a storable energy carrier and, as a fuel and raw material for hard-to-select activities. Multiple NSEC countries have established targets for onshore and offshore green hydrogen production targets. In SG4, NSEC countries will exchange first experiences with hydrogen in correlation to offshore wind, and exchange knowledge on transport infrastructure, RES development and offshore Power-to-X production. They will work together to provide insights on offshore hydrogen production, to discuss the roll-out of electrolysis, and to increase the synergies between the long-term offshore grid and hydrogen network planning. In all aspects of medium and long-term infrastructure planning, SG4 underlining the import of broad engagement on this planning process with member states and relevant stakeholders, including industry and NGOs, to Anticipate and tackle supply-chain bottlenecks (e.g., ports' development and availability) in the rollout and acceleration of delivering our North Seas energy system.
This closely concerns to the import of safeguarding the security of offshore and underwater critical infrastructure, and the supply of critical raw materials, through innovation and enhanced circularity.

2 national objectives and targets

2.1 Decarbonisation dimension

I GHG emissions and removals

I Emission reduction targets

National targets for greenhouse gas emissions consist of targets set by the Cabinet for the Netherlands and targets that are a national translation of European policies.

National Climate Law Targets

The national climate targets are laid down in the Climate Law. The targets for 2030 and 2050 compared to 1990 have been strengthened to bring them into line with the European Climate Law:

- The target of a 95 % reduction in 2050 has been strengthened to include an obligation for the Netherlands to reduce net greenhouse gas emissions to zero by 2050.
- The 49 % reduction target in 2030 has been replaced by a target of at least 55 % reduction, includes land use and is without prejudice to the reduction obligations under the European Climate Law and the binding EU legal acts adopted to implement it.

The Netherlands will also consider intermediate targets for 2035 and 2 040 in the Climate Act. It will be in line with the new European target of 90 % for 2040 as recommended by the European Commission in 2024.

Indicative residual missions by sector in 2030

An acceleration of emission reductions is necessary to achieve the target of at least 55 % reduction by 2030.
In order to achieve with sufficient certainty the increased target of at least 55 % reduction by 2030, the Netherlands intends to focus on approximately 60 % emission reductions when designing climate policy, so that the 55 % is not at stake even in the case of shortfalls.

Table 2.1 gives an overview of the emission reduction target in 2030 based on the KEV202328, the emissions in recent years and the indicative residual missions for 2030 (policy-selected sector codes determining how much a sector can still emit in 2030). It follows that the 55 % reduction target, with the policy that was sufficiently concrete as of 1 May 2023, is within reach (see paragraph 5.1 for further details).

Further policy implementation by sector and specific instruments is described in Chapter 3.

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Parliamentary paper 32813, No 1230.

Table 2.1: Emissions, the emission reduction target and sector residual missions in 2 030 in megaton CO2 equivalent (Sources: KEV2023 and www.emissieregistratie.nl)

Sector	Emissions 2020	Emissions 2021	Emissions 2022	Emissions estimate 2030 (based on KEV2023)	Indicative residual missions in 2030
Electricity	32,5	32,4	30,5	9-23	13,0
Industry	53,3	53,6	49,2	27-42	29,1
Built environment	21,6	24,3	19,6	12-18	13,2
Mobility	29,8	29,7	29,5	18-25	21,0
Agriculture	27,0	27,0	24,5	19-22	17,9
Use of land	4,3	4,4	5,1	2,5-3,7	1,8
Total	**168,8**	**171,5**	**158,4**	**97-123**	
Reduction compared to 1990 (%)	26 %	25 %	31 %	46 % – 57 %	

National obligations arising from ESR and LULUCF

As part of the European Commission's 'Fit-for-55 package', the ESR and LULUCF regulations have been revised. Both regulations have entered into force definitively. The new commitments under the ESR and LULUCF result in the following national targets for the Netherlands:

Table 2.2: National targets under ESR/LULUCF

Obligations	Translation to national purpose
Cumulative emission budget for ESR sectors in the period 2021 until 2030	Ca. 833 megaton CO2eq.
LULUCF (national binding target for 2030)	0.435 megaton CO2eq reduction compared to the average of 2016-2018 29 30 31 32 33 34

According to the KEV2023, total net LULUCF emissions decrease to 2.5 megaton CO 3,7 eq in2, including the policy on the agenda from the Spring Package. The national target for the Netherlands for 2030 – a reduction of 0.435 megaton CO2eq compared to the 2016-2018 average – is also achieved in the estimate, including on the agenda policy. The cumulative targets for 2021-2025 and 2026-2 030 are also within reach: based on the KEV2023, this would result in a positive balance of credits in both

N.B.: the final carbon budgets under the ESR have not yet been determined (depending on mid-term recalibration), the above is an estimate.

Effort Sharing Regulation (ESR)

The ESR covers measures in the sectors built environment, mobility, agriculture and light industry. The ESR sets binding annual greenhouse gas emission reduction targets for Member States that collectively achieve these reductions. The ESR has a cumulative emissions budget for the period 2021-2030. This budget is currently estimated at 833 megaton CO2eq. Annual emission limits apply, also known as AEAs (Annual Emission Allocations). The values for 2026-2 029 are provisional as they are based on 2021-2023 emissions and will only be finalised in 2025 after a comprehensive review. Based on the updated estimate for defined, planned and agenda policies in the KEV2023, emissions under the ESR are expected to be 794-834 megaton CO2eq for 2021-2030. This amounts to a cumulative surplus of 39 to a deficit of 1 megaton CO2eq.

Surplus emissions budget in ESR and LULUCF are to a certain extent interchangeable. In addition, the Netherlands has the possibility to generate a limited additional ESR emission budget by allowing fewer ETS allowances to be auctioned. For the time being, it does not seem necessary to make use of this option.

Land-use, land-use change and forestry (LULUCF)

The revision of the European Land Use, Land Use Change and Forestry (LULUCF) Regulation entered into force on 11 May 2023. The revision increased the common target for the EU in 2030 from 225 megatons of net carbon sequestration to at least 310 megatons of net carbon sequestration by land use than is emitted by land use. This also adapts the net carbon storage targets for 2030 at Member State level. The revised regulation sets new targets for the period 2026-2030, using a four-year budget for the years 2026-2029 and a binding target for the year 2030. If a Member State exceeds the four-year budget, the deficit is multiplied by a factor of 1,08 added to the national target for 2030. The four-year budget will be adopted in 2025. The binding national target for 2030 is a reduction of 0.435 megaton CO2eq compared to the average of the years 2016-2018.

periods.

II Other national objectives and targets, including sectoral objectives and climate adaptation

National climate adaptation strategy

In 2021, the European Commission published a new EU Strategy on Adaptation to Climate Change. This strategy, which is part of the EU Green Deal[29], implements the Regulation for a European Climate Law[30] that requires the EU to be a climate-resilient society by 2050, adapted to the unavoidable impacts of climate change. This objective is in line with national climate change adaptation policies. Both the 2016 National Adaptation Strategy (NAS)[31] and the Delta Programme[32] aim to achieve a climate-resilient and water-resilient spatial installation of the Netherlands by 2050. It focuses on the resilience of our society, the economy, the ecology, the water system and our security. Various tools have been developed within the aforementioned programmes to make climate change knowledge accessible and stimulate adaptation, such as the Climate Adaptation Knowledge Portal, the Climate Impact Atlas and the Climate Damage.

On 9 October 2023, the Royal Netherlands Meteorological Institute (KNMI) published the new climate scenarios for the Netherlands.[33] It follows from these scenarios that the Netherlands will be exposed to the effects of climate change even more frequently than at present. Moreover, these effects will become increasingly extreme, such as heavier rainfalls, higher temperatures, and longer periods of drought and heat. An acceleration of climate adaptation policies is needed to make the Netherlands climate resilient and prevent the impact of the changing climate from increasing. The Cabinet is working to protect safety, health and liveability in the Netherlands, now and in the future, and is therefore intensifying its efforts on climate resilience.

The Government of the Netherlands, together with co-governments, is working intensively on a climate-proof Netherlands. The NAS sets out the overarching strategy and shows how we reduce, or at least keep manageable, the negative impacts of climate change. The Delta programme contributes to achieving the NAS objectives on water safety, freshwater availability and spatial adaptation. The National Climate Change Adaptation Implementation Programme, describes the commitment of the Government for the coming years.[34]

In order to understand the impact on the different policy areas, the Environmental Planning Agency (PBL) works with various scientific institutes to further translate the climate scenarios against societal trends and possible policy scenarios. However, given the urgency, it is not possible to wait until 2026 to revise national adaptation policies. The revision of the NAS, where departments work together to strengthen current policies, has therefore already started. The PBL has looked at what information they could provide in the interim in order to best support the revision of the NAS. The EU Strategy on Adaptation to Climate Change will feed into the development of the new National Adaptations Strategy. The fact sheet “Communication on the management of climate risks”, sent to the House of Representatives on 19 April 2024, sets out the Dutch commitment35 to climate adaptation in relation to related policy fields following the European Commission’s communication on climate risks.

29 Parliamentary paper 35377, No 1.
30 Parliamentary paper 22112, No 2860.
31 https://klimaatadaptatienederland.nl/overheden/nas/.
32 https://www.deltaprogramma.nl/.
33 https://cdn.knmi.nl/system/ckeditor/attachment_files/data/000/000/357/original/KNMI23_klimaatscenarios_gebruikersrapport_23-03. pdf.
34 https://www.rijksoverheid.nl/documenten/rapporten/2023/11/17/bijlage-2-nationaal-uitvoeringsprogramma-klimaatadaptatie-nup-ka.

The new KNMI climate scenarios clearly show the importance of reducing greenhouse gas emissions. Only if these emissions are significantly reduced, in line with the Paris Agreement commitments, will climate change be limited from 2050 onwards. Temperature and precipitation will then remain broadly stable after 2050, while the high emission scenario shows a strong increase. The difference in sea level rise between the high and low emission scenarios is increasing sharply after 2050 and continues to increase until 2300 and well thereafter. The choices made today therefore have a major impact on future generations. The Netherlands therefore remains committed to ambitious climate goals at national, European and global level to mitigate climate change and achieve the goals of the Paris Agreement.

Clean Air Agreement

35Parliamentary paper 22112, No 3930.

The Clean Air Agreement was launched on 13 January 2020. This mainly concerns the reduction of emissions of nitrogen dioxide and particulate matter. The Government works with local and regional authorities to continuously improve air quality in order to achieve health gains for all in the Netherlands. The implementation also involves citizens and businesses. The Clean Air Agreement launches a decreasing trend of emissions to air in all sectors to achieve 50 % health gains in 2030 from emissions from Dutch sources compared to 2016. This will work towards the WHO advisory values from 2 005 in 2030.

National Circular Economy Programme

The Netherlands wants to be fully circular in 2050. In a circular economy, we will be resource-efficient and smart with raw materials and products. We use less raw materials because we use products for longer. We redirect used raw materials to new products. We also choose to replenish raw materials. In this way, the value of raw materials, materials and products is preserved for as long as possible, leaving almost no waste. The effect is that with the use of raw materials in production and consumption we do not emit CO2, do not cause pollution, improve biodiversity and improve the security of supply of raw materials. The environmental impact of the use of raw materials in a circular economy, i.e. of all Dutch production and consumption, should be reduced to the carrying capacity of the Earth by 2050. The Kingdom is working on a concrete definition of the planetary boundaries and the resulting 'safe operational space' for the use of raw materials by the Netherlands. At European level, the Netherlands is committed to further operationalise this.

In order to achieve the objective, more guiding and coercive measures are needed. The National Programme for Circular Economy 2023-2030 (NPCE) includes a mix of standard-setting, price-fixing and incentives. Where the policy focused on the back of the chain, it is now more at the front of the chain. Consider circular design and extending the lifetime of the user phase. Circularity targets for priority product chains have also been developed in the NPCE.

In addition, the NPCE looks at further developing the ambitious climate target for the circular economy. Indeed, circular economy policies contribute to the climate challenge by steering and facilitating (international) sustainable, circular chains. The government decided in spring 2023 and 2024 to take additional measures, including circular measures for which more than EUR 877 million have been allocated or set aside. This is not only a further step towards achieving the objectives of the NPCE, but also aims at an additional CO2reduction of 2,5 megatone.36 37

Based on the results of the Biennial Integrated Circular Economy Reporting (ICER) of the Environmental Planning Bureau, the package of measures in the NPCE can be adapted and expanded.

International transport sectors

Emissions from international aviation and shipping, linked to so-called international fuel bunkers, do not count towards national emission totals. Therefore, in national climate policies, as summarised in Table 2.1, they are not counted under mobility. The government is exploring the possibility and desirability of counting these sectors towards the national 2050-climate target. However, these sectors count towards the objectives of the Paris Agreement. For maritime and inland waterway transport, the Netherlands is moving towards climate neutrality by 2050. For aviation, national climate targets have been set in the Aeronautical Note 2020-2050, starting with a CO2emissions in 2030 equal to or less than 2005. By 2050, CO2emissions shall be halved compared to 2005. This concerns the total emissions from departing flights from the Netherlands and the reduction must take place entirely within the sector.

II Renewable energy

I Contribution to the binding EU target of at least 42.5 % renewable energy by 2030

On 20 November 2023, the revised Renewable Energy Directive was endorsed with an increase in the European target of 42.5 % renewable energy. The indicative target for the Netherlands is 39 % in 2030. The deadline for national implementation started with the entry into force of the Directive.

Renewable energy contribution in 2030

With the agreements in the Coalition Agreement (2022), the Climate Policy Programme and the additional policies announced in 2023 and 2024, the Netherlands is aiming to significantly increase the share of renewable energy through the additional deployment of, inter alia, offshore wind, solar rooftop and scaling up innovative technologies such as hydrogen and green gas. The Dutch contribution to the EU target is a share of 32-42 % renewable energy in 2030, based on the KEV2023 estimate. The

36Parliamentary paper 32813, No 1292.
37Parliamentary paper 32852, No 294.

KEV2022 estimate showed that the Netherlands would reach a share of renewable energy of 25,7-33.9 % in 2030, thus significantly increasing this share. That estimate takes into account the policy known as at 1 May 2023. The share is expected to be higher when also taking into account the new policy announced in 2024. As a result, the expected contribution of a minimum share of 39 % is within the range.

Trajectory towards 2030

The indicative trajectory of the Dutch contribution to the EU renewable energy target between 2021 and 2030 is non-linear due to the nature of large-scale renewable energy projects that are poorly delivered. In 2020, the share of renewable energy in the Netherlands was 11.5 %, with a statistical transfer reaching the binding target of 14 %. In 2021, there was a deficit in the baseline target and the (domestic) share of renewable energy reached 13.0 % (CBS, 2023b). In 2022, the share reached 15 %, above the 2020 baseline target.

II Estimated trajectories for the share of renewable energy in electricity, heating and cooling, and transport sectors

Electricity

The Netherlands is working hard to make electricity generation more sustainable. In recent years, particular efforts have been made to increase the share of solar and offshore wind energy. For a description of the itineraries per mode, see section 2.2.II.iii below. In spring 2023, the Netherlands further increased the ambition for the electricity system: the objective is to have a CO 2-free electricity system intheNetherlands already in 2035, which is affordable and reliable. To this end, measures are taken to achieve CO2freely adjustable power, for example by incentivising the use of hydrogen.

Heating and cooling

The built environment, with 37 % as a sector, accounts for the largest share of national final energy consumption compared to other sectors. The final energy consumption of the built environment has decreased since 2010 mainly due to improved insulation and more efficient space heating installations. The increase in building stock partly does not make savings too much. The decline in final consumption has stagnated for a number of years.

The share of renewable heat in final heat consumption is increasing year on year, reaching 2022 8.8 % in 2020.38 The required annual (average) improvement per year under REDIII (0.8 % per year from 2021 to 2025 and 1.1 % from 2025 to 2030) is compared to the share of renewable heat in 2020. At that time, the share was 8.1 %. Among households, bioraw materials account for the largest share of renewable heat, but this share is decreasing every year. In the services sector, the share of bio-raw materials is much smaller. The number of dwellings connected to a heat network in 2020 is around 430.000. Heat grids are required to report on their sustainability, with the renewable share of energy reaching 38.5 % in 2021.

In 2022, a total of 107.000 new heat pumps were sold (excluding air-to-air heat pumps). This is a growth in sales figures of 55 % compared to 2021.[39] The figures for 2023 show that this growth continues, with 149.000 heat pumps sold in 2023. As a result of the delegated act on renewable cold, it is currently being examined how the share of renewable cooling can be monitored and counted.

The Cabinet commissioned an investigation into whether the Netherlands can meet the binding heat target proposed by the European Commission. Based on the KEV2022 estimate, the share of renewable heat is expected to increase by between 0,5 and 1,0 percentage points per year over the period 2021-2030. Based on the KEV2023 including the Spring Package, the share renewable increases from 0,9 to 1,6 percentage point per year. The standardisation of heating installations has a major impact on the growth of renewable shares as well as energy saving measures. With the additional climate plans in the KEV2023, the binding part of the renewable heat growth sub-target of around 0,95 percentage points per year on average over the period 2021-2030 is within reach, but the target including the indicative top-up of 1,9 percentage points per year is not yet reached. However, it is important that the policies set out in the KEV2023 are actually implemented. Currently, the study is being updated on the basis of the latest policy and final text of REDIII. Once the REDIII study has been completed, the Netherlands will also make the further translation into a national objective the choice of whether to use waste heat and/or electrification in the implementation of the target.

Transport

38 CBS (2 023 g) Renewable energy in the Netherlands 2022 | CBS.

In the view of sustainable energy carriers in mobility, the Netherlands indicates how fossil fuel can be replaced in any mode.39 The Netherlands sees a role in the future for hydrogen as an energy carrier for heavy-duty vehicles, such as trucks and buses, and in replacing diesel trains, and as a necessary application in aviation and shipping. In addition, biofuels will play an important role during the transition and, in the aviation and maritime sectors, probably also in the final picture.

On the road to CO2reduction, innovative biofuels will reduce emissions for the existing fleet (including logistics). Many biofuels are already produced from waste and residues. The increase in biofuels should mainly be derived from sustainable biogenic residues (including cascading use). This is in line with the Netherlands' objective of using bio-raw materials as high quality as possible and in developing the circular economy. For the use of renewable (biological and synthetic) fuels in aviation, the Netherlands applies separate targets: 14 % in 2030 and 100 % in 2050.

At least until 2030, the road to sustainable mobility is marked by the transport energy policy. It implements the revised Renewable Energy Directive (REDIII). From 2026 onwards, fuel suppliers will be obliged to reduce CO2chain emissions by supplying renewable energy instead of fossil fuel for four modalities (land, inland waterway, aviation, maritime). This obligation is progressive.

III Estimated trajectories for each renewable energy technology

The Netherlands is strongly committed to increasing the share of renewable energy in the energy mix between 2020 and 2030. The intended development per technology is discussed below.

Onshore renewable electricity – (solar and wind)

The 35 Climate Agreement set out the 2 030 terawatt hours of solar and onshore wind generation (together 'renewable on land') in 2019. It is up to the regions to identify new search areas for wind and/or solar energy in regional energy strategies. The RES Monitor 202340 shows that current renewable electricity generation is about 25.5 terawatt hours (11 terawatt hours large-scale zon-PV and 14.5 terawatt hours onshore wind). In combination with the projects in the pipeline and the ambition for new projects, the monitor considers that the target of 35 terawatt hours will be achieved.

[39] CBS: https://opendata.cbs.nl/#/CBS/nl/dataset/81955NED/table?ts=1698931316987.

There are arrangements such as SDE + + and the SCE to apply for a subsidy for wind and solar PV projects. Within the ISDE, a subsidy may be requested for small wind turbines. In May 2022, further policy was also announced to further increase the build-up of capacity generated by zon-PV.41 Among other things, standards for solar rooftop have been announced and will be in line with the current EPBD Directives.

Offshore wind energy

The 2030 Wind Energy Roadmap for the Sea sets the ambition to increase the capacity of offshore wind energy from 3 gigawatts in 2022 to around 11.5 gigawatts installed in 2030.42 In 2022, the Netherlands doubled this ambition for offshore wind energy to an established capacity of around 21 gigawatts around 2030.43 This doubling is in line with the European Commission's call on Member States to accelerate the development of renewable energy.44

The Supplementary Road Map Windenergie2030 sets out the wind energy areas in which these wind farms will be built and how this deployment will take place over time.45 The following schedule shows this schedule:

Size	Wind energy area, lot (s)	Tender lots	Expected intakes ofwind farm	Status

39Parliamentary paper 32813, No 572.
40Parliamentary paper 32813, No 1342.
41Parliamentary paper 32813, No 1046.
42Parliamentary paper 33561, No 42.
43Parliamentary paper 32813, No 974.
44European Commission; REPowerEU: joint European Action for more affordable, secure and sustainable energy, COM (2022) 108 final; Communication from the European Commission: 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality, COM (2021) 550 final.
45Parliamentary paper 33561, No 53.

0,75	*Borssele*, Lots I and II	Achieved in 2016	2020	Realised
0,75	*Borssele*, Lots III, IV and V	Achieved in 2016	2020	Realised
0,76	*Hollandse Kust (South)*, Lots I and II	Achieved in 2017	(2022-2023)	Under construction
0,76	*Hollandse Kust (South)*, Lots III and IV	Achieved in 2019	(2022-2023)	Under construction
0,76	*Hollandse Kust (North)*, Lot V	Achieved in 2020	(2023)	Under construction
approx. 0,7	*Hollandse Kust (west)*, Lot VI	Achieved in 2022	(2025-2026)	Planned
approx. 0,7	*Hollandse Kust (west)*, Lot VII		(2025-2026)	Planned
approx. 1,0	*IJmuiden Ver*, Lot III	Fourth quarter 2023	(2028)	Planned
approx. 1,0	*Ijmuiden Ver*, Lot IV		(2028)	Planned
approx. 1,0	*IJmuiden Ver*, Lot I		(2029)	Planned
approx. 1,0	*IJmuiden Ver*, Lot II		(2029)	Planned
approx. 1,0	*Ijmuiden Ver (north)*, Lot V		(2029)	Planned
approx. 1,0	*Ijmuiden Ver (north)*, Lot VI	Second quarter 2025	(2029)	Planned
approx. 2,0	*Lower wiek (South)*, Lot I		(2030)	Planned
approx. 2,0	*Lower wiek (North)*, Lot II		(2030)	Planned
approx. 2,0	*Lower wiek (North)*, Lot II	2026 *	(2031)	Planned
approx. 0,7	*Hollandse Kust (North)*, Lot VIII	2026/2027 * *	tbc * *	Planned
approx. 0,7	*North of the Wadden Islands*, Lot I	2026/2027 *	(2031)	Planned
approx. 2,0	*Doordewind*, Lots I	2027 *	(2031)	Planned
approx. 2,0	*Wind*, Lots II	2027 *	(2031)	Planned

* Tender data for these wind energy areas are indicative. A final decision on planning is expected to be taken in 2024, based on the results of the research programme for the closure of Wind in Sea – Eemshaven (PAWOZ – Eemshaven) for *Ten north of the Wadden Islands* and *Doordewind*, and the landing survey for Load III of Lower *wiek*.

* * the tender date for this wind energy area is indicative. Pending clarity on Tata Steel's plans to improve the sustainability of energy supply and the production process, further decision-making will take place.
This will be linked to the decision on the landing of the relevant part of the net at sea.

In 2023, the target of 4.5 gigawatts of offshore wind power was achieved on time and budget.46

In addition, authorisations were granted in 2020 and 2022 for the construction and operation of three new wind farms, with a total installed capacity of approximately 2.2 gigawatts.47 All three wind farms were authorised without subsidy, with the last two having also paid a financial offer to obtain the permits. Wind farm permit-granting procedures are also currently steered to reduce the negative impact and strengthen the positive impact on the North nature as well as on integration into the energy system, for example through the production of renewable hydrogen or other forms of flexible demand.

In the coming years, the partial revision of the North Sea Programme will identify new wind energy areas for the possible realisation of offshore wind energy after 2031.

In the preparatory steps for the further deployment of offshore wind energy after 2030, the Netherlands takes into account about 50 gigawatts of installed capacity in 2040 and about 70 gigawatts in 2050. However, this depends on whether it is spatially adaptable at sea and on land and is in line with the evolution of demand. It is expected that, in addition to electricity, hydrogen will be produced in the North Sea. The location of electrolysis plays a role in reducing the expected grid congestion at landing around 21 gigawatts of offshore wind energy around 2030.
Offshore electrolysis is expected to play a key role in unlocking further offshore wind farms. This is also interesting from lower land take at sea, compared to electricity cables, and lower transport costs via hydrogen pipelines. The knowledge platform HEROW and the Ministry of EZK are working on two demonstration projects of electrolysis at sea. These are planned before 2030 (100 megawatts) and around 2030 (500 megawatts). The offshore wind landing (VAWOZ) programme 2031-2040 (rvo.nl) also takes into account the landing of both electrons and molecules.48

46 Parliamentary Document 33 561 No 59, see also Viering Roadmap 2023 – Wind at sea.
47Hollandse Kust (North), Lot V and Hollandse Kust (West) Lots VI and VII.
48Parliamentary paper 33561, No 54.

As the wind energy areas will mainly be further off shore after 2030, the Netherlands will implement a hub based approach to deploying offshore wind energy after 2030. This means that, for these larger areas, a comprehensive view will be given in which form (electrons or molecules) the energy generated can best be brought to land. To this end, the North Sea Energy Infrastructure Plan 2050 will be drawn up with a strategic picture of where the Netherlands expects energy hubs and what infrastructure is needed for this purpose. This development for offshore wind energy after 2030 is conditional on its being adaptable to the North Sea, given the other interests such as shipping, nature and fisheries.

Solar energy at sea

The Netherlands is investigating the possibilities of installing solar energy at sea shortly after 20 303 gigawatt peak. The scheme for the licensing of the Ijmuiden Ver plovel Beta wind energy49 area includes an incentive to achieve up to 50 megawatts of solar power at sea. These offshore solar parks will be realised within offshore wind farms. The first offshore solar pilot (approx. 1 megawatt peak) is currently taking place. Research on the environmental impacts of solar energy at sea is needed to establish final objectives and determine whether scaling up after 2030 is desirable. EUR 44.5 million has been mobilised for an innovation programme dedicated to solar energy at sea.

Ocean Energy

The potential of ocean energy technologies is too low to make a substantial contribution to the national energy transition. For this reason, the Netherlands has no objectives in the field of ocean energy. There are opportunities for Dutch companies abroad, where the potential is higher. Wherever possible, the policy aims to support these parties in their foreign ambitions.

Hydrogen

Hydrogen plays a crucial role in making industry, transport and electricity more sustainable.
With the adoption of the revised European Renewable Energy Directive (REDIII) and upcoming obligations for Member States regarding the use of renewable fuels of non-biological origin (RFNBOs); mostly renewable hydrogen (carriers)) for industry (42 % in 2030 and 60 % in 2035) and transport (1 % in 2030). With REDIII, the hydrogen market is entering a new phase of development. We must now lay the foundations for the long-term security of supply of hydrogen. This requires both production in the Netherlands (in particular through energy from offshore wind) and the import and application of hydrogen (carriers). The Climate Agreement sets the ambition that electrolyser capacity in the Netherlands is 500 megawatts in 2030 3 and gigawatts in 4 to 2 025 gigawatts, with the development in line with the additional growth in the share of renewable electricity. In addition to own production, the first coarse estimate is that around 50 % of imports will be required, including transit.

Regulating framework conditions and stimulating the market requires an integrated approach. Therefore, the National Hydrogen Programme was launched in 2022. This public-private programme focuses on unlocking the supply of renewable hydrogen, developing the necessary transport, storage and import infrastructure, working with various sectoral programmes, and facilitating ongoing initiatives and projects. This programme also promotes synergies between infrastructure and the use of both low-carbon and renewable hydrogen. The plans and actions for the coming years are described in the Hydrogen Roadmap.50 This roadmap informs policies, but is not a policy in itself. Furthermore, the Roadmap sets out a certain ambition based on the situation in the early twintic years; market conditions have changed since then, anticipating with current policy developments.

Given the excellent starting position of the Netherlands for the production, import and deployment of renewable hydrogen and the high existing demand for hydrogen, the Netherlands can assume a dominant position in this area. Offshore wind energy will play a crucial role in Dutch hydrogen production. The production of renewable hydrogen, according to the criteria set out in the Renewable Energy Directive, requires a large amount of additional, unsubsidised renewable electricity.

All Dutch industrial clusters have indicated in their Cluster Energy Strategy (CES) that renewable and low-carbon hydrogen will play an important role in their sustainability strategies. Work is ongoing on CES 3.0, which will provide a better understanding of hydrogen supply and demand. There are EU obligations for the use of renewable hydrogen in industry and transport. At the end of 2022, the government tightened the ambitions for hydrogen production in the Netherlands, with a new target of 8 gigawatt electrolysis capacity in 2032. With the use of the refinery route, the subsidies made available for domestic production through the IPCEI (2 rd wave), the All-Renewable Hydrocarbon Production through Electrolysis (OWE) subsidy scheme and SDE + +, this supply is not yet sufficiently achieved. This is why additional tools consisting of grants and standards are being put in place. Within the PEH, priority areas are identified where hydrogen production contributes to the energy system as much as possible, through spatial control on large scale electrolysis near electric landing and near the hydrogen transport network. Hydrogen

49Merger of IJmuiden Ver Lots III and IV.
50https://www.nationaalwaterstofprogramma.nl/over+ons/routekaart+waterstof/default.aspx.

transport, storage and import projects are included in the Multi-Annual Programme for Infrastructure for Energy and Climate (MIEK), through which the Government manages these projects.

Since 2022, the development of this Dutch hydrogen transport network by Gasunie-subsidiary HynetServices has been underway. This network will use more than 80 % of existing natural gas pipelines. The most concrete demand for transport capacity is initially expected in the four coastal industrial clusters. Powered by renewable electricity produced mainly at sea, electrolysers will produce renewable hydrogen in the coastal industrial clusters. Imported hydrogen also enters the country in these port clusters. For new infrastructure to be built, the procedures for spatial integration under the Omgevingswet have now started. The timing of the construction of the transport network also depends on the demand of the companies and also on the progress of the Delta Rhine Corridor. With growing hydrogen production and demand, storage is also needed to ensure flexibility and security of supply. The production of hydrogen through electrolysis – coupled with renewable electricity – is seasonal and weather-dependent. Therefore, large-scale hydrogen storage is needed to accommodate peaks and falls in this production profile, but also in the demand profile.

In the meantime, procedures have been launched for hydrogen storage in salt cavernes in Groningen by Gasunie subsidiary EnergyStock. The possibility of hydrogen storage in empty gas fields is still being explored. This will create a nationwide hydrogen network, with sufficient storage capacity and connection to neighbouring countries. Regional distribution networks will also be part of this, so that in the long term the entire industry, Dutch mobility and (parts of) the built environment can be supplied with renewable hydrogen. Hydrogen may also play a role in CO2 free, controllable power in the electricity sector. In addition, the agricultural sector, including glasshouse horticulture, is also looking at possible uses of hydrogen.

In addition, the government is working to stimulate innovative hydrogen projects and a human capital agenda, in particular within the GreenpowerNL programme and through the Energy TopSector (TKI Nieuw Gas).
Finally, work is ongoing on the conditions for the international market for hydrogen, for example on the same rules (standardisation), quality criteria and safety standards for hydrogen transport, storage and use, and on the certification of hydrogen (carriers). This is done with neighbouring countries, the European Union and countries outside Europe. The government also encourages the construction of import terminals and cooperation with different countries is sought through bilateral Memoranda of understandings (MoUs) and EU tools such as Projects of Common Interest (PCI)/Connecting Europe Facility (CEF) aimed at establishing corridors between exporting countries and North-West Europe. Diversification is an important condition for future security of supply and therefore the Netherlands is working with a wide range of countries inside and outside Europe. Participation in the German H2Global initiative also supports the procurement of imported hydrogen through an auction mechanism.

Currently, there is no specific consumer policy for hydrogen, but Book 6 of the Civil Code applies, which is about contract law. There are currently not to a few consumers connected to hydrogen.

Green gas (biomethane)
Through the Groen Gas Programme, the Netherlands is aiming to scale up green gas production in the Netherlands to 2 billion kub (bcm) in 2030. The programme does not yet include ambitions for 2050, but it explicitly explores the role that green gas can play in the energy and raw material system in 2050. In order to achieve the ambitions for 2030, the programme is working on various measures focusing, inter alia, on the business case, spatial integration and resource availability.

The Netherlands is currently working on a blending obligation that will oblige energy suppliers to supply administratively a growing amount of green gas to end users who will be covered by ETS2. This obligation should ensure a long-term stable business case for green gas producers and corresponding investments in production capacity. The obligation will work with a CO2chain emissions target to incentivise emission reductions throughout the whole chain (including the agricultural sector) and will reach a target of 3.8 megatons of CO2 eqof chain reduction by 2030. In addition, for the short term, the promotion of fermentation, including the conversion of existing biogas plants to green gas, and gasification under the Stimulering Sustainable Energy Production and Climate Transition (SDE + +) scheme. In order to stimulate the demonstration of gasification projects on a scale, a separate tranche of the Demonstration Energy and Climate Innovation (DEI +) incentive scheme of up to EUR 98 million will be opened in 2024 for the demonstration and scaling up projects aimed at collecting residual streams. In addition, an additional EUR 500 million has been allocated from the Climate Fund for additional openings of this scheme from 2025 onwards.

In order to speed up the realisation of installations, network operators are looking at addressing bottlenecks in terms of insufficiency capacity, for example where gas quality requirements or *reverse flow* investments are concerned.
For a number of bottlenecks already identified, an amendment to the Ministerial Order on gas quality is under preparation. In

addition, the co-authorities are exploring how permitting and spatial integration could be accelerated. The Netherlands is working, among other things, to provide additional support to co-authorities through guidance and the creation of a Expertise Centre of Groen Gas to provide knowledge on green gas and permitting. Finally, fermentation is included as a sustainable agricultural technique aimed at reducing methane and nitrogen emissions in the National Programme for Rural Areas and the agricultural sustainability plans. It also looks at ensuring the sustainability of the raw materials and the fermentation or gasification process, and establishing the right policy and legal frameworks for the extraction of bio-raw materials and the marketing of residual streams (digestate and biogenic CO2) from the fermentation process.

Geothermal

The target for geothermal to achieve petajoules by 2030 15 is laid down in the Climate Agreement. In 2022, the geothermal sector produced 6.8 petajoules.51 Recent figures from Geothermie Nederland indicate that the heat produced from geothermal was almost unchanged in 2023 compared to 2022. In addition, the letter of October 2023 to the Second Chamber on the State of SDE + +52, states 53 that seven applications were submitted in 2023 for Stimulering Sustainable Energy Production and Climate Transition (SDE + +) for deep geothermal. Each with a limited volume of heat generation. However, there is still a significant number of SDE + + applications from previous SDE + + rounds that have been granted. These projects still need to be realised.

To stimulate the development of geothermal in the built environment, EZK is working on an acceleration pathway for geothermal. Together with Geothermie Nederland, LNV and Energie Beheer Nederland (EBN), the Netherlands (EBN), the obstacles currently causing stagnation in development were examined. A plan for phase 2 of the acceleration path is currently being developed, in which these obstacles are being removed. Projects will then look at how to overcome these obstacles. This path will be further developed by a (new) Task Force and Accelerating Team.

Bioenergy combined with CO2capture and storage (BECCS)

In the Netherlands, BECCS is allowed but subsidised to a limited extent. In 2022 and 2023, the SDE + + was opened to waste incineration plants (avis) where two thirds of emissions are biogenic. There are no operational BECCS projects yet, but it is expected that they will be realised under the Aramis-0 project.

For the SDE + + 2024, PBL has calculated on the basis of the market consultation a category for CCS in relatively small scale biomass combustion plants. This is a form of BECCS. In spring 2024, it was considered whether and how this category could, under conditions, be included in the SDE + + 2024.54 This pass-on concerned only a new subsidy for the CCS, not for the combustion itself. The SDE + + 2024 will open in final form after the summer. In parallel, for the SDE + + round of 2025, it is considered whether wider forms of BECCS in the SDE + + are adaptable, such as CCS in gasification, fermentation, biorefining or biobased chemistry. The climate package presented in the spring 2023 note agreed that the government will commit to achieving 1.5 megatons of negative emissions in 2030. In parallel, the government is working on the negative emissions roadmap, which reflects the long-term commitment to negative emissions. This will be shared with the House of Representatives in 2024. BECCS can also take place on the own initiative of the market and, if possible, be produced without subsidy.

IV Estimated pathways for bioenergy demand and supply of biofeedstocks, including the impact of the forest biofeedstocks on the LULUCF emission sink

The Netherlands sees an important role to play in using sustainable bioraw materials to achieve a climate-neutral and circular society by 2050. Bioraw materials are seen as indispensable for ending dependence on (imported) primary fossil raw materials and mineral minerals, for example in chemicals, construction and in the production of aviation and maritime fuels. In doing so, the Netherlands also looks at the risks and concerns associated with the use of bio-commodities, including air quality, deforestation, and biodiversity loss.

To address these concerns, the Netherlands has developed an integrated sustainability framework for bioraw materials. The sustainability criteria focus on the application of all types of bio-based raw materials, including materials for the circular economy (such as materials for construction and raw materials for the chemical industry) and the use for energy generation. These are bioraw material flows and applications promoted or regulated by the government. For the time being, the sustainability criteria do not apply to the use of bio-raw materials for fibres (paper and textiles) and to feed and food production, including transport. With

51 CBS (2 023 g) Renewable energy in the Netherlands 2022 | CBS.
The52 SDE + + grants to companies and non-profit organisations that produce large-scale renewable energy or reduce CO2emissions.
53Parliamentary paper 31230, No 383.
54The Main Line Agreement is expected to change this policy. For more information, see the box on the main lines agreement in chapter 1 of the INEK.

regulatory provisions, sustainability criteria will apply to all uses of bioraw material streams that are incentivised or regulated under climate and circular economy policies.

Subsidised bioraw materials for energy applications have long been subject to strict criteria, including through the RED and the Regulation on Conformity Assessment of Solid Bio-Raw Materials for Energy Applications. The envisaged sustainability criteria in the sustainability framework bioraw materials are therefore largely based on the REDIII and the conformity assessment scheme.

In addition, the sustainability framework includes an overarching commitment to the use of bio-feedstocks for different high and low grade applications. This concerns biofeedstock applications as an energy source and as a feedstock. As a result, sustainable bioraw materials are only used when applied in the final picture or in the transition towards it. Where sustainable alternatives become available in the short term, this will lead in the long term to a reduction in the use of biofeedstocks for those applications. At present, for example, the use of biofeedstocks for low-temperature heat, which has not been subsidised since 2022.

Finally, it is being explored whether the sustainability framework can be broadened to fibres (paper and textiles) and to food and feed. Work is already underway to increase the availability of sustainable bioraw materials from the Netherlands, in conjunction with the promotion of new business models for the agricultural sector. This means that production and the use of biotic (residual) flows must give a (regional) perspective to agriculture. The multiple neglect of sustainably produced bio-raw materials and the high quality commitment based on the cascading principle are important principles. In cascading, we first encourage the use of other uses before we burn, ferment or gilt bio-raw materials for energy generation. At the same time, the potential of biofeedstocks in the Netherlands is too limited to meet Dutch demand in 2030 and 2050. In addition to increasing the availability of bioraw materials in the Netherlands, imports of sustainable biofeedstocks will therefore continue to be necessary. Chapter Four deals with biomass consumption.

v Other national trajectories and objectives, including in the long term or by sector

NPE – energy system development pathways

For the main chains of the future energy system – electricity, hydrogen, carbon and heat – development paths have been defined in the NPE. The focus is on demand and supply developments beyond 2030 and until 2050. The development paths reveal opportunities, uncertainties and trade-offs for production, transport, conversion, storage and use. They are in line with the transition paths for the use sectors (built environment, mobility, industry and agriculture) that reflect the adaptation of energy demand up to 2050. And they indicate the desired direction of development based on a balance between public interests and remaining choices to be made on the agenda. These development paths are not “off”: they are not defined routes to a detailed final picture and do not specify the use of policy instruments. They are the premise to a more detailed direction of development, including the use of legal, financial, spatial and socio-societal policy tools.55

The electricity chain is becoming the backbone of the future energy system. To this end, it should not only become free of CO_2, but also grow to three or more than four times the current size. From energy efficiency point of view, electrification is a preferred route for making the energy system more sustainable. The electricity chain also supplies more and more electricity for conversion to hydrogen, heat and synthetic fuels over time.
This requires a massive scaling up of supply from renewable sources and nuclear energy, a huge increase in transport infrastructure, smarter use of existing transport infrastructure and the building of a diverse supply of flexibility, including storage.

The hydrogen chain is further built as a chain. On the supply side, this concerns the build-up of electrolysis, in conjunction with the development of offshore wind, the production of blue hydrogen through capture in (current) production of hydrogen from natural gas and imports of hydrogen. At the same time, the current hydrogen supply needs to be preserved, while building the deployment of hydrogen in industry, heavy transport and for electricity production.
In doing so, the transport network and storage of hydrogen are built to grow with supply and demand.
There are considerable uncertainties in the longer term about the scale of hydrogen deployment, for example for the production of synthetic fuels for maritime and aviation in the Netherlands.

The carbon chain (hydrocarbons, both fossil origin and sustainable) is shrinking over time due to the phasing out of fossil fuels and substitution by the use of electricity, hydrogen and heat. At the same time, the remaining effort should be preserved by replacing fossil hydrocarbons with biofeedstocks, recycling and – over time – synthetic carbon. In doing so, the use of carbon as a fuel is steadily decreasing. In 2050, the two main forms of carbon use are deployment as fuel for maritime and aviation and

55 Parliamentary Document 32813, No 1319, NPE Deepening Document B – Developing pathways of the energy system.

feedstock in industry, for example in chemistry.

The heat chain in the NPE covers the use of locally produced heat delivered to users through collective systems in the built environment and agriculture (glasshouse horticulture). There is also a significant upscaling, where sustainable heat sources (geothermal, aquathermia, solar thermia) and waste heat are the main feed for collective heating systems. These collective systems then provide a growing share of heat supply for households and glasshouse horticulture, replacing the use of natural gas. In addition, the use of this heat through collective systems reduces the deployment of scarce, sustainable energy carriers such as electricity, hydrogen and bio-raw materials.

Gas extraction Groningen

In the 2021/2022 gas year, the maximum allowed gas extraction was Nm 4.5 billion Nm^3. From October 2022, the Groningen field was on the pilot flame for the safety of the residents of Groningen. This means that a minimum amount of gas was extracted in the gas year 2022-2023: 2.4 billion m^3 from the eleven production sites remaining on 1 October 2022, a number which was reduced to five as of 1 April 2023. As of 19 April 2024, the Groningen field was definitively closed.

2.2 Dimension energy efficiency

I Objectives from the Energy Efficiency Directive (EED)

The Energy Efficiency Directive (EED) is an EU directive from 2012 with the aim of reducing energy consumption in the European Union. The EED has been revised as part of the European Commission's 'Fit-For-55 package'. This revised version entered into force in October 2023.

Indicative national contribution for the reduction of total energy consumption in 2030

The EED was revised in 2023. The main objective (now Article 4) is set at a 11.7 % reduction in total energy consumption in 2030 compared to the energy consumption reported in 2030 on the basis of the EU 2020 Reference Scenario. Member States shall set indicative national primary and final energy consumption57 targets to contribute to the collective EU target. The Netherlands aims to achieve primary energy consumption of up to 1.935 petajoules in 2030, which translates into a final energy use of 1.609 petajoules. The KEV2023 shows that the primary consumption target is not met in the estimate with adopted and planned policies. The expected primary energy use in KEV2023, including the climate plans in the Spring Package, ranged from 1.951 to 2.323 petajoules. According to the KEV2023, when all the planned policies, including those included in the Spring Package, are implemented, and there are no influential factors (such as hot winters), the final target will be achieved with an estimated final energy consumption of 1.566 to 1.818 petajoules in 2030.

Table 2.3: Comparison of targets, projections and current energy use (in petajoules)

	Energy use 2019	KEV2023 forecast For 2030	EED targets (current) for 2030
Primary energy use	2.668	1.951-2.323	1.935
Final energy use	2.011	1.566-1.818	1.609

In order to achieve the targets, a national energy saving programme shall be set up. Within this programme, the savings targets will be broken down by sector. Due to the time needed for the related saving measures to have an effect, the savings are expected to be achieved mainly after 2026. By the end of 2024, the KEV 2024 is expected to have a clearer picture of the phasing-out path towards the final target of 1.609 petajoules by 2030.

Savings obligation of public institutions

Article 5 of the EED is a new objective and requires Member States to reduce the energy use of public institutions (central, regional and local authorities and entities governed and financed by public authorities) by 1.9 % per year, compared to 2021. In the first two years this target is indicative, after which it becomes binding. A list of which public authorities would be subject to this obligation has been drawn up. A database is currently under preparation, which will also be used for Article 6. To date, there are only rough estimates that are not complete with the list of public bodies established.

Renovation obligation of public institutions

Article 6 requires Member States to renovate annually 3 % of the building surface of public institutions to NZEB in accordance with Article 9 of Directive 2010/31/EU. This applies to buildings owned by public institutions.
The obligation concerns buildings owned and occupied by public institutions with a useful surface area greater than 250 m^2. Currently, an estimate is made of how many square metres are involved.

National energy savings obligation

Article 8 requires Member States to achieve energy savings for end-users of 0.8 % of final energy consumption in the years 2021 to 2023, 1.3 % in the years 2024 and 2025, 1.5 % in the years 2026 and 2027 and 1.9 % in the years 2028 to 2030. This obligation is cumulative, meaning that savings are added over the years. As a result, a measure contributes more to the achievement of the target when it is implemented earlier. The cumulative saving target from 2021 to 2030 will therefore be 1.285 petajoules, which is 361 petajoules higher than the previous target of 924 petajoules. Only savings attributable to national policies are taken into

The57 targets focus on energy consumption and exclude non-energy consumption, use of energy carriers as raw materials in production processes. Final energy consumption is the energy consumption of end users in the built environment, industry, agriculture, mobility and aviation. Primary energy consumption is final energy consumption plus own consumption and conversion losses in the energy sector, such as electricity production and refineries.

account. The climate plans expect cumulative savings of between 1.168 and 1.415 petajoules in the KEV2023. The cumulative national policy target of 1.285 petajoules is within that range. The calculation of the energy savings obligation is further explained in the Energy Savings Methodology document (see Annex 3).

National energy savings obligation with regard to energy poverty

Article 8 (3) also requires Member States to achieve a share of energy savings to be achieved among vulnerable consumers or households affected by energy poverty. In line with this obligation, the share of energy savings to be achieved in this group will have to be at least as high as the share of households affected by energy poverty. This share amounts to 6.4 % of the total (corresponding to 456.000 households in 2021, see for more details section 4.5.V), making the cumulative energy savings obligation target for this group of 82 petajoules (6.4 % of the total target of 1.285 petajoules).

II The indicative milestones for 2030, 2040 and 2050, the nationally established measurable progress indicators and their contribution to the European Union's energy efficiency targets

The built environment accounts for more than 30 % of total energy consumption in the Netherlands. In line with the Netherlands' broader energy and climate policy, the sustainability of the built environment is primarily driven by CO2reduction. This means that CO2 emissionceilings have been chosen as indicative milestones for improving the sustainability of the built environment and that progress will be measured by megaton CO2-eqemissions. For 2030, following the Spring decision-making process, the Netherlands has a new target for the built environment of 13.2 megaton CO2eq in 2030. Therefore, in order to achieve the long-term energy and climate goals, it is essential to make the national building stock more sustainable by 2050, so each sector has a target of becoming CO2neutral. No official intermediate target has yet been defined for 2040.

In order to reduce the energy needed for heating, hot water and cooling, energy performance standards for buildings should be developed in line with the EPBD IV. In addition, efforts should be made to further accelerate the implementation of natural gas free and efficient heating techniques. In this context, due consideration is given to supporting vulnerable groups, including households in energy poverty.

III Other national energy efficiency targets

The Netherlands has no other national energy efficiency targets outside the national energy savings obligation.

2.3 Dimension energy security

I To increase the diversification of energy sources and supply from third countries, to increase the flexibility of the national energy system and to address interrupted or limited supply of an energy source

Electricity

As a result of the decarbonisation of the energy system and the growth of energy from renewable sources, the share of weather-dependent electricity production is growing. To ensure the security of electricity supply, the energy system will need to become more flexible. This can be achieved by developing more demand response, storing electricity, releasing the controllable power of CO2, and interconnection also contributes significantly. The security of electricity supply continues to be monitored in a quantitative manner by TenneT TSO.

A reliable supply of electricity is, in addition to affordable and sustainable, an important objective of Dutch policy. The competitive electricity market contributes to this, including through the system of programme responsibility and the imbalance market. With further growth in the share of intermittent sources, the demand for flexibility in the market will increase even more. In addition to imports and exports, gas plants in the Netherlands now play an important role in terms of flexibility, which will have to become free under the pressure of the ETS CO2in order to continue to provide flexibility in a market-based manner. Flexibility in the form of demand response, storage or controllable power is intertwined in the electricity market and is traded across the different markets without being precisely identifiable as flexibility. In the National Energy System Plan (NPE) issued at the end of 2023, the government identifies the development of flexibility in the electricity system as an important priority. The implementation of the NPE looks, inter alia, at whether the various flexibility options are expected to be sufficiently developed and, if not, what possible public interventions could be used to promote flexibility in the system. When implementing the new flexibility provisions in the EU Electricity Market Design-package – due to enter into force in mid-2024 – the government will also pay attention to the assessment and evolution of the flexibility needs in the electricity system.

Natural gas

Following Russia's invasion of Ukraine, the Netherlands decided in early 2022 to work towards independence from Russian fossil energy imports as soon as possible. Thanks to the measures taken, the Netherlands is now no longer directly dependent on Russian fossil energy. The Netherlands continues to support measures that promote the reduction of Russian gas in order to minimise the flow of revenues to Russia. At the same time, the government stresses that energy policy must not have irresponsible adverse effects on the security of gas supply.

On the supply side of gas, this involves diversification of imports – primarily through the expansion of LNG import capacity and the acceleration of own production from small gas fields in the North Sea. The diversification policy is discussed in more detail in section 2.3.II below.

On the demand side, the energy transition is accelerated where possible and the Netherlands is focusing on gas savings. This will also reduce market tightness and dependence on imports. The Netherlands consumed on average 30 % less gas in 2023 than in the years preceding the loss of supply from Russia. The largest savings were achieved in industry, followed by households. The Dutch saving of natural gas is explained in Chapter 2.2.I.

In the interest of security of gas supply, the Netherlands has also set the objective of filling gas storage to at least 90 % on average at the beginning of winter 2023-2024. This has been achieved, and the beds were filled to almost 100 %.

The Netherlands therefore goes beyond what is necessary in accordance with the obligations laid down in Regulation (EU) 2022/1032 amending Regulations (EU) 2017/1938 and (EC) No 715/2009 as regards gas storage, as it results in a filling rate of 73 % to be achieved on 1 November 2023.

In order to reach the 90 % filling rate, the Dutch government has taken a series of filling measures. For the medium term, the Netherlands has drawn up a vision for the deployment of gas storage facilities (Kamerbrief 29 023, No 442, Visie stored on 23 June 2023).

In the Netherlands, a large proportion of protected customers are households. In order to prevent protected customers from being left without natural gas during a period of extreme cold without natural gas due to a shortage of production and transmission capacity,

the network operator of the national gas transmission network Gasunie Transport Services (GTS) has the legal responsibility to reserve volume and capacity to supply protected customers in case of extreme cold. TSG is therefore responsible for the peak supply to protected users in those cases where the temperature is in the range -9 °C to -17 °C. The transport infrastructure takes into account a temperature of -17 °C so that TSG is able to transport the necessary volumes in these cases.

Among others, the International Energy Agency (IEA), Gasunie Transport Services (GTS) and the European Commission warned ahead of winter 2023-2024 that there is a risk of gas shortages. However, this was not the case, but if there had been shortages which could not be absorbed by the market, savings and sustainability, the Gas Protection and Recovery Plan (hereinafter: BH-G) implementing the emergency plan to be drawn up periodically under the Gas Security of Supply Regulation. The BHG contains a series of measures that minimise the social and economic impact of a shortage and aim to safeguard the security of gas supply to protected customers, including households.

Work is ongoing on the legislative proposal on the security of gas supply, which should make it possible to deliver genuine solidarity if needed (EU 2017/1938 Art. 13). As regards the three bilateral solidarity scheme to58 be closed, the need for this is being considered as default solidarity provisions are added to Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply through the so-called decarbonisation package.59

Petroleum

The Dutch (nature) oil infrastructure plays an important role as a node for North-West Europe in terms of import and export of oil and oil products between industrial clusters, sea and airports. The Netherlands can continue to play this role in the future, including renewable fuels and carbon carriers, such as biomethanol and pyrolysis oil. Without the Dutch oil infrastructure, much of the hinterland would receive much fewer deliveries. As part of the ARA + trading hub and as the largest European exporter of diesel/gas oil, the Netherlands, as a reliable trading partner, contributes to European energy security. The Netherlands is therefore deeply embedded in the international supply of petroleum products. This function therefore represents a major economic interest for the Netherlands.

Oil is already diversified as a product in itself. The origin of oil processed in the Netherlands can be traced back to different sources. The oil market is a global market that is not regulated. The security of oil supply depends mainly on the stability of net exporting countries and unhindered passage on major oil routes on Earth. Geopolitical conflicts have a significant impact on oil transport and related insurance, which can make oil prices volatile. The war in Ukraine and a possible escalation of conflicts in the Middle East are examples of this. The EU and G7 sanctions on imports of Russian crude oil and petroleum products as of February 2 023 in response to Russia's aggression against Ukraine led to shifts in trade flows.
In the framework of the G7 Price Cap coalition in which EU Member States participate, the attestation system (taking of evidence) was further strengthened in the 12th sanctions package of December 2023. Since October 2023, unrest in the Middle East has been caused by the armed conflict between Hamas and Israel and attacks by Houthi units on commercial and naval vessels in the Red Sea. The Red Sea is a crucial route for shipping between the Suez Canal and the Indian Ocean. The global market has so far proved capable of meeting these challenges.

European parties have found other suppliers of oil and oil products instead of Russia, and supply flows have been partially extended via Kaap de Goede Hoop.

Within the Netherlands, many sectors depend on oil or oil products such as the chemical industry, shipping, aviation, road transport and households. Despite the energy transition, oil is expected to remain an important part of the Netherlands' energy mix and raw materials market in the coming years. The Netherlands is therefore closely monitoring the situation on the oil market in order to be able to intervene in a timely manner if there is a risk of shortage or shortage. The market exists in the interplay of supply and demand, in which both the energy use of oil and its use as a feedstock compete with each other. A supply disruption leads almost directly to market turbulence and a rapid increase in prices, leading to a significant economic impact. In order to avoid negative economic consequences, EU Member States and the International Energy Agency (IEA) maintain strategic oil and oil product stocks, which can be mobilised by collective action by OECD countries to avoid scarcity/shortage and to reduce the oil market.

58Currently, there is an obligation for Member States whose gas systems are connected directly or through a third country to conclude solidarity agreements with each other.
59Parliamentary paper 29023, No 494.

According to the 2012 Petroleum Products Stockpiling Act, both industry and the government (through the Central Body for the Stockpiling of Petroleum Products, COVA) are obliged to maintain strategic stocks of oil, petrol, kerosene and diesel. In addition to contributing to collective actions by OECD countries, these stocks contribute to security of supply to domestic oil consumers, such as industry and transport. The Dutch stockholding obligation is based on international calculation methods of the IEA and the EU. The EU Member States calculate the stockholding obligation on the basis of the 90 days net import method (IEA calculation method, difference in imports and exports of crude oil and petroleum products) or the minimum 61 days of domestic consumption method, the latter being the lower limit. The Netherlands is in a special position, due to a high naphtha consumption as a blending component in the petrol export flows, which has led to a sharp decrease in net import figures in recent years. As a result, the Dutch stockholding obligation has been at the lower limit of 61 days of domestic consumption since 2019, as stated by the EU. In addition, the government considered in November 2022 that this minimum is too low for the Netherlands and therefore intends to increase the legal obligation to 90 days of domestic consumption.

The stockholding obligation of industry is calculated on the basis of their domestic sales and deliveries of aviation fuel, resulting in a coverage of approximately 20 % of the national stockholding obligation. The COVA liability consists of the difference between the total calculated national duty and that of industry. In practice, Cova is therefore responsible for about 80 % of the national stockholding obligation.

Decarbonisation of oil infrastructure

Based on the PBL's Traject exploration climate neutral, the expected impact of decarbonisation on oil infrastructure can now only be captured in a rough future sketch. Demand for oil and oil products will fall in the coming decades, but certainly not disappear in the short and medium term. In many scenarios, oil continued to be used as a fuel feedstock after 2050, in particular for international aviation and shipping. The transition to renewable carbon will affect national demand for oil products in the long term and may also reduce or convert refining capacity in the Netherlands. The pace of this process depends to a large extent on the sustainability of mobility (transition to EVS) and sustainable fuel use by international shipping and aviation, which is regulated at European level. Another factor is the speed at which the chemical industry will demand renewable raw materials (or semi-finished products). However, instead of phasing out oil infrastructure, due to the energy transition, the Netherlands may see an increase in new industrial activity for the storage and production of renewable fuels. This includes planned production capacity in the Netherlands of Sustainable Aviation Fuel (SAF) by, for example, SkyNRG, Shell, Neste, and VARO Energy. This is due in particular to the increase in demand for, inter alia, SAF in the run-up to the EU minimum blending obligation of 2 % SAF in aviation as of 1 January 2025. The Dutch oil infrastructure plays an important role as a node for North-West Europe in the field of oil and oil products between industrial clusters, sea and airports and will continue to do so in the future, including renewable fuels and carbon carriers, such as biomethanol and pyrolysis oil. Existing infrastructure (which is largely privately owned) can be reused to a large extent. As it is not yet known which renewable land and fuels will become dominant, market participants may convert or upgrade more different types of terminal capacity than ultimately needed. For the transition to hydrogen and capture and storage of CO2, the government also supports the construction of new tubes in addition to the existing lines for oil products, such as the Delta-Rhine corridor.

Hydrogen

A robust climate neutral energy system and a sustainable industry requires both sufficient domestic CO2free hydrogen production and a diversified import portfolio. The development of various low-carbon hydrogen sources alongside renewable hydrogen, such as (rest) gas with CO2capture and storage (CCS) or through gasification of residual waste, is important to ensure sufficient supply for fast emission reductions among users. In addition, imports will be needed in the form of liquid hydrogen and a variety of hydrogen carriers (some of which can also be used directly as fuel or feedstock without conversion to hydrogen gas). The global hydrogen market is yet to be developed and has many uncertainties. Their construction requires an active foreign policy by the government to ensure that these imports are made on the ground in a timely, sustainable, safe and large-scale manner. The priorities are:

1. addressing market and coordination failures in the early stages of import development;
2. achieving the first import export chains, with a focus on diversification of hydrogen carriers; and
3. focus on International Corporate Social Responsibility (IMVO).

The Netherlands is committed to building relationships with a wide group of countries and regions, to diversify different hydrogen carriers and to stimulate sufficient import infrastructure, such as import terminals, conversion facilities for hydrogen carriers and access to the national hydrogen network (the 'backbone'). The Netherlands is currently developing a policy strategy for the import, transhipment and transit of hydrogen carriers within the Netherlands, including with a view to spatial integration, safety and environmental aspects. This affects both the end use in the Netherlands and the transit of hydrogen (carriers) to neighbouring

countries. In addition, the Netherlands is also promoting the market through financial instruments such as participation in H2Global, for which EUR 300 million has been made available from the Climate Fund.

Green hydrogen is then an obvious CO2free fuel when it comes to flexible CO2– free electricity generation. It provides for the supply of inflexible electricity demand that is not covered by solar and wind electricity generation. Dutch gas-fired power plants offer a good starting point for switching from natural gas to hydrogen. Given the currently limited availability of green hydrogen and the expected increasing demand from industry and mobility, the actual large-scale deployment of hydrogen in power plants is likely to take place only after 2030. The industry and mobility sector need renewable hydrogen to meet EU targets. There are also several initiatives in the field of low-carbon hydrogen, which may already be disposed of in the electricity sector that is not subject to EU targets. Power plants should have access to hydrogen infrastructure.

Biomass

The deployment of sustainable bio-raw materials (also known as: biomass) now and towards 2030 and 2050 is necessary to make the Dutch economy more sustainable and meet the climate challenge. The National Energy System Plan (NPE) assumes that the use of fossil carbon carriers in the direction of 2050 is minimised and, if possible, phased out altogether. Fossil carbon carriers are largely replaced by electricity, green hydrogen and heat from renewable sources, but for the chemical sector, aviation and shipping in particular, there will continue to be substantial carbon demand in 2050. Sustainable bioraw materials, in addition to recycling and synthetic carbon carriers, are indispensable to sustainably fill the permanent carbon demand.

Bioraw materials are thus indispensable for ending dependence on (imported) primary fossil raw materials and mineral minerals. This applies not only to the energy system, but also, for example, to chemicals, construction and the production of aviation and maritime fuels. A prerequisite for the use of biofeedstocks is that they have a sustainable origin. Within the Netherlands, the sustainability framework for biofeedstocks, which requires biofeedstocks to have a sustainable origin and use as high quality as possible, guides biofeedstock policy. This could include less use of biomass in low-grade applications (low temperature heat, electricity) and building up high-value applications (construction materials (wood construction and other innovative applications) and as a raw material for chemistry).

In order to alleviate pressure on bioraw material demand, the NPE, in line with the sustainability framework, presents a final picture where sustainable carbon carriers are deployed as much as possible towards 2050 for aviation and maritime transport, chemistry and only as a closing feature in other energy sectors. That is to say: only where carbon-free alternatives are difficult or not feasible. Nevertheless, even if biofeedstocks are used only for the essential uses, domestic supply will not be sufficient to meet the estimated demand. In order to keep import needs small, the Netherlands is focusing on maximising domestic bioresource flows. This will be reflected in a bioraw materials strategy. In addition, the NPE has also announced an import strategy for sustainable carbon carriers (including bio-feedstocks).

In addition, to increase the domestic availability of sustainable biofeedstocks, several actions have been included in the Implementation Agenda of the Sustainability Framework. This concerns mainly agricultural (residual) flows. It is also necessary to have the best possible insight into better identifying future demand for and supply of biofeedstocks. Therefore, a study is currently being carried out by CE Delft to better understand the overall supply and demand of different renewable energy carriers and sustainable carbon carriers – including bio-raw materials – at European level. This research will identify aggregate supply and demand and will make it possible to understand a possible gap between supply and demand and clarify the need for imports and demand reduction. The NPE has provided a first estimate and comparison of the future supply and demand of sustainable carbon carriers, including biofeedstocks, for the energy system. This picture will need to be refined in the coming years through further research.

In addition to increasing the availability of bioraw materials in the Netherlands, imports of sustainable biofeedstocks will therefore continue to be necessary. See point 2.1 dimension decarbonisation/renewable energy).

Fissile materials

For the production of electricity from nuclear power plants, it is important that there is sufficient supply of fuel in the form of enriched uranium. Currently, Russia plays an important role in the fuel chain; for both conversion and enrichment. In order to reduce conversion dependency on Russia and China, Canada, the US and France are in the process of increasing their capacity in this area.

In the field of enrichment, according to the Euratom Supply Agency (ESA) Annual Report 2021, 31 % of enrichment services for

nuclear power plants in the EU were carried out in Russia. Many countries in Europe and North America also want to reduce this dependency. This increases the demand for enriched uranium from, inter alia, the Dutch-German-British company Urenco. It is one of the few Western companies able to enrich sufficient quantities of uranium. In order to meet the growing demand, Urenco is working to increase capacity.
The operator of the Borssele nuclear power plant (EPZ) has indicated that it no longer has direct business with Russia, but there is an indirect dependence on the reuse of uranium. The Netherlands is also exploring the possibilities to break the indirect dependence on Russia for the reuse of uranium.

Cyber resilience energy sector

Our economy and society are increasingly dependent on digitalisation of the energy sector. The war in Ukraine, dependence on Russian gas, geopolitical and interference from countries such as Iran and North Korea underline the need to consider security in both the current energy system and its further development. Moreover, the increase in extreme weather also requires increased resilience of the energy system. This entails certain risks. The changing geopolitical landscape is accompanied by external threats to our vital infrastructure from both state and non-state actors that can damage the cybersecurity of organisations and supply chains within the energy sector. But internal threats also play a role, e.g. lack of adequate cybersecurity measures, lack of awareness among staff about possible cyber risks, outdated IP systems, lack of protocols. These external and interrelated threats can lead to cyber incidents (knowingly or unconsciously) that can halt critical energy supply processes that can have a major disruptive economic, physical and socio-societal impact. Strengthening the cyber resilience of the energy sector is therefore essential for a secure, reliable and affordable energy supply.

The different developments create an altered and dynamic threat picture for the energy sector.
The resilience of the energy sector should therefore be further strengthened, with a particular focus on resilience against attack actors in both the digital and physical domains with the aim of ensuring continuity of supply and security of supply. Indeed, information technology (IT) and operational technology (OT) are necessary to keep these processes running and to ensure the service of different energy carriers. Given the scale of the challenges facing the energy sector (in addition to a changed geopolitical context and a changing threat picture, energy transition and grid congestion), it is essential to closely consider the prevention and/or mitigation of vulnerabilities and dependencies when designing the energy system.

As part of the statutory task and the extension of this legal remit of the Minister for Economic Affairs and Climate Policy (EZK) and the Minister for Climate and Energy (KE) to increase the digital security of the energy sector, EZK is implementing the increase and tightening of safety requirements under new regulations. For example, this Cabinet is working on the implementation of the European Network and Information Security Directive 2 (NIS2 Directive), which is expected to be implemented in the Netherlands in the third quarter of 2025 through the Cyber Security Act (CBW) implementing legislation. The NIS2 will replace the current Network and Information Systems Security Act (WGNI). The NIS2 contributes to the expansion of existing cybersecurity framework for, inter alia, the energy sector (comprising the sub-sectors electricity, district heating and cooling, oil, gas and hydrogen) falling within the scope of the NIS2 Directive as an essential sector and ensures the strengthening and harmonisation of cyber security to achieve a high common level of cybersecurity across the European Union.
This removes differences between Member States in terms of cybersecurity requirements imposed on organisations providing economically important activities or services. Organisations in the energy sector will be subject to an obligation to report incidents in accordance with the Directive, have to take security measures (duty of care), be supported by a Computer Security Incident Response Team (CSIRT) with advice and assistance, and proactive monitoring of compliance with the obligations of the Digital Infrastructure Inspectorate (RDI).

In addition to the NIS2 Directive, other sector-specific cybersecurity delegated acts are under development. Currently, this is the Network Code on Sector-specific Rules for Cybersecurity Aspects of Cross-border Electricity Flows (Network Code) which oversees additional cyber measures in the electricity sector. The electricity sector network code is expected to enter into force in the fourth quarter of 2024. Other sector-specific network codes may be added from the European Commission for example for the gas sector in the future.

In the NIS2 package, the Cabinet is also working on the implementation of the Critical Entities Resilience Directive (CER), which is expected to enter into force in the Netherlands in the third quarter of 2025 through the Critical Entities Resilience Act (Wwke). The Critical Entities Resilience Directive (CER) is similar to the existing WGNI but covers the physical threat domain such as terrorist attacks and sabotage. Unlike NIS2, the Ministry of Economic Affairs and Social Affairs designates the critical entities covered by the Critical Entities Resilience (CER) Directive. For designated vital parties, this entails a duty of care (obligation to take measures to ensure resilience) and a duty to report: for incidents that significantly disrupt or potentially significantly disrupt

the provision of essential services.

In addition to these developments, EZK is also committed to raising awareness of cyber risks and cybersecurity in the energy sector by helping to create a cyber ecosystem of strong public-private communities in which the sector cooperates proactively and shares cyber security information.

II Increasing the diversification of energy sources and suppliers from third countries

Natural gas

In order to avoid shortages, despite demand reduction, it is crucial to ensure and increase a diverse supply of natural gas.

The geopolitical situation has fundamentally changed gas flows on the north-west European market, of which the Netherlands is part. Where transport first went primarily from east to west, transport is now mainly needed in the opposite direction. Gas entering via pipelines from Norway, Belgium and the United Kingdom as well as through LNG terminals is placed on the Dutch market and partly transported further within North-West Europe.

In view of the limited scope for diversification of gas port via pipelines, the Netherlands has started to significantly increase LNG import capacity for the entire North-West European gas market.

In 2022, LNG import capacity in the Netherlands doubled from 12 to 24 bcm per year. This doubling has been achieved through the realisation of the temporary Eems Energy Terminal (EET) in the Eemshaven and the extension of Gate terminal in Rotterdam. In addition, the Gate terminal will be further expanded by the construction of an additional tank. This will become operational in 2026, and will increase the capacity of the terminal from the current 16 bcm per year to 20 bcm per year. EET is also gradually expanding to a total of 10 bcm per year. In addition, several feasibility studies by market participants on LNG import capacity are ongoing.60

In addition to expanding sec LNG import capacity, it is important to attract more LNG to the EU. In this context, the Netherlands is in favour of voluntary joint purchasing of gas through the Energy Platform for the North-West European Market. The government has also launched an investigation into securing the long-term LNG needs of the Netherlands. It will also consider whether additional policies are desirable. Furthermore, bilateral energy diplomacy is61 an important part of the Dutch strategy, alongside joint efforts at EU level. Strengthening the security of energy supply of the Netherlands and the EU aims to strengthen relations with public and private parties in gas and, above all, future hydrogen producing countries. This also strengthens the position of the Netherlands as an important landing point for gas and hydrogen.

Electricity

Due to the existence of a high level of interconnection capacity, the Dutch electricity market is strongly linked to markets in neighbouring countries. This automatically leads to a high degree of diversification of energy sources from third countries. The Netherlands has interconnections with the United Kingdom, Norway and Denmark by sea, and with neighbouring countries Germany and Belgium by land. The objectives for decarbonisation and expansion of the share of renewable energy generate further diversification of generation techniques in the electricity market. In addition, the Netherlands is investigating the construction of two new nuclear power plants.62 See Chapters 2.1.I and 2.1.II.

III Reducing energy import dependency from third countries

Natural gas

Dutch gas extraction from the small fields on land and at sea will make an important contribution to security of supply in the coming years. Accelerating gas extraction in the North Sea can make an important contribution to reducing import dependency in addition to energy savings and scaling up renewable energy production.

Dutch gas production from small fields has been declining for 20 years due to natural depletion and limited replenishment of new findings. In order to offset this decrease in production from the Dutch small fields at sea, the Cabinet presented in July 2022 an acceleration plan for gas extraction in the North Sea. Overall, an acceleration of gas extraction from the North Sea could lead to an additional production of between 2 and 4 bcm per year over a period of 10 years on top of the current production of 9 bcm which is expected to decrease gradually in the coming decades. As regards land extraction from the small fields: the forecast is that up to 2047 a total of 35 bcm will be extracted from the small fields on land.63

As of 1 October 2023, no gas was extracted from the Groningen field. Only under very strict conditions could some production

60Parliamentary paper 29023, No 494.
61Parliamentary Document 29023, No 431 and Parliamentary Document 32813, No 1143.
62The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).
63Geological Department of the Netherlands, Delfstoffen and geothermal energy in the Netherlands, Annual Report 2021.

sites be created in the event of imminent serious security of supply problems. As of 19 April 2024, the Groningen field was definitively closed.

Petroleum

Oil imports from third countries will continue to be necessary, as the Netherlands does not absorb crude oil itself. Oil flows and thus oil prices can be strongly influenced by geopolitical conflicts. The war in Ukraine and the recent conflict in the Middle East have shifted international trade flows. As described in Chapter 2.3.I, the oil market is an unregulated global market with a high level of diversification of sources in itself. As long as the market is able to function, the market determines the price and allocation of available oil around the world.

Despite the reduction of greenhouse gases and the sustainability of the energy mix, oil and its refined products are expected to remain an important part of the energy and raw materials mix for the time being. Therefore, as a member of the EU and the IEA, the Netherlands takes the security of oil supply and stability of the oil market particularly seriously. The Netherlands will – if called upon by EU or IEA – deploy part of its strategic oil stocks in a collective action with a view to ensuring the stability of the oil market, as happened in March and April 2022. The Netherlands is already preparing for this and can use this measure directly on demand.

Fissile materials

The national raw materials strategy aims to increase the security of supply of critical raw materials in the medium term64. Global control of critical raw materials is becoming increasingly geopolitical in addition to an economic dimension. For nuclear energy, uranium is an essential raw material. However, geopolitical risks in the field of material acquisition are relatively limited in the longer term for nuclear energy. There are sufficient uranium stocks worldwide and there is a diversity of suppliers. In addition, it is possible to store uranium for a long time without degradation of the material. The Netherlands therefore has sufficient diversification options.

Electricity

The Netherlands is part of a (north-west) European electricity market that is highly interconnected and integrated. In this context, electricity imports and exports are very significant. In our region, countries remain interdependent. The Netherlands is committed to further integration of the electricity market with all neighbouring countries due to its benefits, inter alia, in terms of security of supply and reduced price volatility. The Netherlands therefore has no specific policy to reduce electricity imports from third countries.

IV Increasing the flexibility of the national energy system, in particular by deploying domestic energy sources, demand response and energy storage

Natural gas

The deployment of national gas sources is described in section III above. The Netherlands currently has around 14 bcm of storage capacity (working volume) to cover seasonal fluctuations and peaks in gas demand. The government has set the target of filling gas storage by an average of at least 90 % at the beginning of winter 2023-2024. To achieve this, the Dutch authorities have taken a series of filling measures. In addition, the Netherlands has developed a medium-term vision for the deployment of gas storage facilities.65 Work is ongoing on a legislative proposal on the security of gas supply, which aims, inter alia, to provide a legal basis for some of the measures announced in this vision.

Electricity

The market organisation of the electricity market is now regulated by the Electricity Act 1998, as well as the underlying regulations and technical codes of the Authority for Consumers and Markets (ACM). In the context of "flexibility", it is important that the vast majority of connections now have a remotely readable measuring device. For large connections (> 3X80A, especially businesses), this is more than 90 % for small connections (mainly households) about 85 %. The regulatory framework already allows for "flexibility" in the electricity system in several ways, for example through congestion management, aggregation and demand response services (mainly companies), supply contracts based on flexible tariffs and the possibility for "multiple suppliers on a connection" (MLOEA). Furthermore, the regulatory framework allows everyone, subject to specific conditions, to use the electricity system, for example through the deployment of battery storage or the introduction of solar production by households.

64Parliamentary paper 32852, No 224.
65Parliamentary letter 29 023, No 442, Vision stored on 23 June 2023.

The legislative proposal for the new Energy Act (intended to replace the 1998 Electricity Act and Gas Act) aims to further strengthen this regulatory framework and is also in line with Directive 2019/944. The entry into force of the Energy Act is part of the Recovery and Resilience Plan. Key elements for increasing flexibility in the electricity system are:

- Rounding of the transition to digital measurement systems (remotely readable where possible);
- Commitment to "free" data sharing through a revised data management and data exchange regime;
- Optimising existing regulation to become "active" in the market (better embedding energy community, aggregation, demand response, etc.);
- Create additional space for the use of data from additional measurement points "behind" the connection (sub-metering);
- Scope for system operators and ACM to develop particular transport methods and conditions, which can mitigate the effects of transport scarcity. This could include, for example, "non-firm" transport contracts.

There is a huge increase in requests to connect batteries to the electricity grid. With the rapid increase in installed wind and solar power, an increasing share of electricity production from domestic energy sources comes. No fixed prices for producers are foreseen.

In 2023, a temporary price cap for retail consumers for gas, electricity and heat was occasionally introduced, as the energy market was in an uncertain situation with high prices and high volatility during that period. In order to provide timely support and certainty to households, the price cap intervened in energy bills. The mechanism with volume limits of 1 200 m^3 gas and 2 900 kilowatt-hour of electricity per household does maintain a full marginal price incentive for a part of households, leaving – albeit more limited – market forces and an incentive to become more sustainable.

2.4 internal energy market dimension

I Electricity interconnection

The European Council agreed on an indicative interconnection target for 2030 of at least 15 % of the generation capacity. The Netherlands largely complies with this: with an average electricity consumption of less than 14 gigawatts in 2020, the interconnection capacity was 9.1 gigawatt.[66] The Netherlands has interconnection with Belgium, Germany, Denmark, Norway and the United Kingdom. Interconnection capacity continues to grow to 9.8 gigawatts in 2025 and 10.8 gigawatts in 2030.67

The Netherlands has no specific quantitative objective in terms of interconnection. Any plans for new interconnectors will consider, for each interconnector, the welfare effects (including effects on the security of electricity supply) and the projected costs.

II Energy transmission infrastructure

In order to accommodate the growth in the number of renewable generation installations (both on land and at sea), it is necessary to create sufficient capacity on the electricity network of regional and national grid operators in a timely manner. Timely and comprehensive spatial planning, including energy infrastructure from the start, is more important than ever. The transport, conversion and storage of electricity, natural gas, biogas, hydrogen, CO2 and heat will also need to be coordinated in order to minimise the spatial impact and overall investment needs.

The government therefore68 launched in December 2022, together with interested parties, the National Action Programme for Network Conductions (LAN), in which it cooperates with more than 50 actions contributing to increasing capacity on the network. In addition, as indicated above, the Cabinet manages infrastructure projects of national interest through the MIEK. For the regional scale, this is done in the Netherlands using the provincial MIECs (PMIECs, for more information on MIEK, section 3.1.I under the Electricity sector). Furthermore, regional and national network operators delivered the first integrated Energy Infrastructure Outlook 2030-2050; work is now underway on the second edition to be delivered at the end of 2023.69 Investment plans shall be drawn up setting out the investments needed to meet the need for transportcapacity. It will also look at how congestion management, including new opportunities such as flexibility deployment, energy storage and demand and supply matching, can make the best use of available space on the grid at the lowest societal cost. In addition, consideration will be given to how the costs of energy infrastructure can be charged and, where necessary, proposals for adaptation are made.

Further efforts are being made to increase grid capacity in the Netherlands. For example, a new 380-kV connection is currently being established in the north-west of the Netherlands (project North-West 380 kV), as the sea above the Eemshaven is an important production site and Eemshaven has also become an important switchover point in the international electricity network. In addition, the project South-West 380 kV aims to solve existing bottlenecks in this part of the country so that the offshore offshore wind farms can be connected to the national network. In September 2022, the responsible ministers made the necessary special-purpose changes by means of a Government Implementation Plan. In addition, work is ongoing to upgrade existing 220 kV high voltage connections (‘use better’ programme) and the planning procedure for four new 380 kV high voltage connections has been launched and two more are under preparation. In addition, both the central and local authorities are working hard to plan the necessary new 220/380 kV high voltage stations or to expand existing 150/220 high voltage stations.

[66] electricity interconnection capacity, 2015-2021 | Compendium for the Environment (clo.nl).

For the connection of offshore wind farms, TenneT uses a concept based on standard platforms, allowing 700 megawatts of wind energy to be connected for near-coastal wind farms per platform.
Five of these platforms have now been delivered; there are two to four more. TenneT uses standard platforms of 2.000 megawatts to connect the wind farms beyond the sea. The delivery of eight of these platforms is foreseen for the period 2028-2031. The North Sea Energy Infrastructure Plan (EIPN) identifies the infrastructure needed for the period after 2032. This is based on the targets for 2035 (35 gigawatts), 2040 (50 gigawatts) and 2050 (70 gigawatts). The plan provides a realisation agenda that

67 TenneT (2022), Monitoring Leveringszekerheid 2022_12JAN2023.pdf (tennet drupal.s3.eu-central-1.amazonaws.com), p. 44.
68Parliamentary Document 29023, No 385 National Action Programme for network congestion.
69https://www.netbeheernederland.nl/dossiers/toekomstscenarios-64.

gradually removes the necessary infrastructure and market organisation issues over time, in order to roll out the necessary offshore wind infra.

The Dutch gas transmission and distribution infrastructure is mature and robust, but the infrastructure is being expanded. This is done, inter alia, by the construction of a new large-scale nitrogen installation capable of converting between 5 and 7 billion m^3 high calorific gas into low calorific gas on an annual basis. This plant at Zuidbroek has been fully operational since October 2023. The Grijpskerk gas storage has been converted to store low calorific gas instead of high-calorific gas. In addition, in addition to what has already been achieved in 2022, there is a further increase in LNG import capacity in the coming years (see explanation in section 2.3.2) and the Bacton-Balgz pipeline (BBL) from the UK to the Netherlands (and vice versa) has been adjusted in 2023 to increase import capacity (during the summer period).

The government has also announced work on the deployment of alternative refuelling and recharging infrastructure under the recently revised European Regulation for Alternative Tank and Charging Infrastructure (AFIR). For charging infrastructure, this is done within the National Load Infrastructure Agenda. The agenda provides an overview of the recharging infrastructure needed and sets out the frameworks within which its deployment should take place. Within the AFIR framework, the same is done for the deployment of hydrogen filling points and shore-side electricity connection.

III Market integration

I Increasing the flexibility of the system

Due to a further increase in intermittent sources in the electricity system, the Netherlands considers that more flexibility in the system is necessary. Through the legislative agenda for the coming years, the Netherlands is setting the market organisation in such a way that flexibility (including for small consumers) can be made even more accessible and small consumers have better access to the market and are rewarded in line with market conditions. In the Netherlands, about 88.5 % 70 of small consumer connections are now smart meters and will increase further in the coming years. Using a dark to the smart meter, a smart meter enables consumers to better react to real time prices. Dynamic price contracts and DSR agreements allow all final customers to react directly to price fluctuations in the market. There is already a lot of flexibility in the system, such as for large consumers who are flexible and react to real-time prices by switching up, up- or downloading, and parties with storage assets offering on the different markets. Where necessary, barriers to storage will be removed.

Independence of network management ensures that fair competition in supply and wholesale markets is possible and the reliability of systems is enhanced. Competition between different suppliers in the energy market is good for the degree of affordability.

In addition, the system of ‘programme responsibility’ or balance sheet responsibility regulates that suppliers and customers themselves balance supply and demand on the electricity market. They experience an economic incentive to achieve agreed deliveries and purchases.

Further market integration, such as shortening the gate closure time of the intraday market, and avoiding fragmentation of markets for flexibility can help to unlock additional flexibility in the system.

II Non-discriminatory participation of renewable energy, demand response and storage in all energy markets

In general, the Dutch government pursues electricity market frameworks that promote fair competition between market participants and therefore do not discriminate against any party. This includes parties offering renewable energy, demand response and storage, including through aggregation. This will also be regulated by law by the Energy Act.

III Participation of consumers in the energy system, self-generation and new technologies, including smart meters

There are no specific objectives, except for the target of supplying 2020 80 % of Dutch small electricity and gas consumers with a smart meter by 2020. This objective has been achieved (see also 2.4.III.i). In general, the Netherlands aims to ensure that consumers can benefit as much as possible from competition in the energy market, make informed choices and receive fair remuneration for returned electricity. No separate, national objectives have been set for this purpose.

Furthermore, in a competitive Dutch market, consumers choose from a variety of different types of service providers. Suppliers offer different types of contracts, for example contracts for the supply of 100 % renewable energy, supply of 100 % renewable

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electricity of Dutch origin, etc. The Dutch retail market had licensed suppliers in May 2022 57 that often offer multiple propositions. The Netherlands also normally has a relatively high percentage of annual switchers (in 2021 27 %).

In addition, more and more consumers generate electricity through solar panels. Due to the offsetting scheme, they can offset inputs and decreases. For electricity that cannot be netted, the consumer shall receive reasonable compensation from the energy supplier.

IV Ensuring the adequacy of the electricity system as well as the flexibility of the energy system in renewable energy production

For the time being, the Netherlands assumes that a well-functioning electricity market provides the right incentives for market participants to invest in generation capacity where and when it is needed, i.e. an energy only market. In addition, the Netherlands has a large number of interconnectors with neighbouring countries, which can also meet Dutch electricity demand and increasing exports.

Reliability is a key objective of Dutch policy alongside affordability and sustainability.
The competitive electricity market contributes to this, including through the system of programme responsibility and the imbalance market. Incentivising renewable electricity can have an impact on the level of security of supply. Energy supply is becoming more dependent on weather conditions. With the growth in the share of intermittent sources, the demand for flexibility in the market will increase. The Netherlands already has considerable flexibility to deal with the loss of demand or supply in a manner consistent with market conditions. In the National Energy System Plan (NPE) issued at the end of 2023, the government identifies the development of flexibility in the electricity system as an important priority. The implementation of the NPE looks, inter alia, at whether the various flexibility options are expected to be sufficiently developed and, if not, what possible public interventions could be used to promote flexibility in the system. When implementing the new flexibility provisions in the EU Electricity Market Design-package – which will enter into force in mid-2024 – the Netherlands will also pay attention to the assessment and development of the flexibility needs in the electricity system.

The flexibility needed can come from interconnection, demand side response (including dynamic tariffs), storage and controllable production. The analysis and mapping of options shows that developments in the energy system have the potential to provide sufficient options to meet the short-term demand for flexibility. Long-term flexibility requires a mix of different sources of flexibility, including controllable power. This controllable power will have to be increasingly CO2free from 2030. Several options are potentially available for this purpose: Co2free hydrogen, renewable sources such as bioraw materials and green gas, nuclear energy and deployment of fossil sources capturing CO2. For the Netherlands, nuclear energy is one of the options for the future energy mix. Nuclear energy reduces the need for flexible power and storage and diversifies electricity production. Several studies for 2050 show that nuclear energy can be a cost-effective option and that a positive long-term business case could be possible.

In view of the turnaround times, additional generation of electricity from nuclear energy in the Netherlands does not seem likely for 2030.

For the production of electricity from nuclear power plants, it is important, inter alia, that there is sufficient supply of fuel in the form of enriched uranium. Many countries in Europe and North America want to reduce dependency on Russia. This increases the demand for enriched uranium from, inter alia, the Dutch-German-British company Urenco. They are one of the two Western companies capable of enriching sufficient quantities of uranium. In order to meet the growing demand, Urenco is working to increase capacity. In addition, the Netherlands, together with the relevant stakeholders, is exploring the possibilities to break the indirect dependence on Russia for the reuse of uranium.

Radioactive waste is generated in the production of nuclear energy, in the conduct of nuclear research and in medical applications. Radioactive waste can remain hazardous in hundreds to sometimes thousands of years. It is therefore stored carefully and securely, in accordance with the requirements of the independent regulator ANVS (Authority for Nuclear Safety and Radiation Protection). EU Member States are required to establish a national programme for the management of radioactive waste and spent fuel every ten years. This national programme on radioactive waste sets out how a Member State is dealing with it now and in the future. The first Dutch national programme on radioactive waste was published in 2016. For 2026, the Netherlands should have published a new national programme.

The development of Small Modular Reactors (SMRs) is fast. SMRs may play an important role in the (sustainable) industry and in areas of the Netherlands further away from the coast. SMRs can also play a role in the production of heat and hydrogen. Market

introduction seems possible abroad from 2030 onwards. The use of bio-raw materials is considered within a broader sustainability framework, which is discussed in more detail in sections 2.1.II.iv and 3.1.III.

While the electricity market is sufficiently equipped to achieve the necessary flexibility, it is important to continue to monitor the development of flexibility, including controllable capacity. To this end, TenneT's annual monitoring of security of supply is increasingly aligned with the ENTSO-E annual European Resource Adequacy Assessment and the Electricity Regulation. In addition, the Netherlands sees increased uncertainty due to the difference between weather years and electricity production from wind and solar. The energy crisis has also shown that governments are intervening in prices. Finally, there is uncertainty as to the extent to which public authorities drive the energy transition with, for example, the expansion of nuclear energy, wind and solar power generation capacities. As a result, the income from controlled assets becomes more uncertain in any given year. For the longer term, the Netherlands is exploring the instruments that can contribute to ensuring security of supply so that they can be deployed at the same time as the results of monitoring at national and international level give rise to it.

v Consumer protection and the competitiveness of retail trade in the energy sector. No specific objectives have been set for this purpose. The Dutch government is pursuing electricity market frameworks that promote fair competition between market participants and therefore do not discriminate against any party, including those offering renewable energy, demand response and storage, including through aggregation. The regulator monitors developments in the retail market on a regular basis. The Dutch retail market is highly competitive with normally relatively high switching rates (27 % in 2021). The Dutch policy on retail competitiveness and consumer protection is described in section 3.4.III.iv.

IV Energy poverty

The Netherlands has not set a national target with regard to energy poverty.

2.5 research, innovation and competitiveness dimension

I Public and, where available, private funding for research and innovation

The Dutch approach to research, innovation and competitiveness has been partially adjusted compared to the INEK for the period 2021-2030. In a generic sense, the Netherlands aims to invest in innovation of 3 % of GDP in 2030.[71] the Netherlands is one of Europe's innovation leaders and is in the top 3 of the European Innovation Scoreboard (EIS). This is done as much as possible in public-private partnerships to stimulate valorisation and increase knowledge dissemination. On the one hand, we are deploying generic innovation toolbox (investment funds, fiscal measures) to promote innovation and strengthen the competitiveness of the Netherlands. On the other hand, we are deploying targeted toolbox specifically aimed at accelerating the climate and energy transition.
We do this through mission-driven top sector and innovation policy (MTIB). From the generic innovation policy, the size of funding varies greatly from year to year. This is due to the fact that the measures are on demand (fiscal measures, investment funds); and no annual standard budgets. In general, these measures have a high private contribution. The dedicated innovation policy currently invests EUR 600 million per year in Climate and Energy Innovation (EUR 240 million public and EUR 360 million private).[72] Shares of public and private funding are not an objective in themselves, but instrumental in achieving policy objectives (see heading II).

The biggest change in public-private innovation funding compared to the previous reporting is the introduction of the National Growth Fund. With the National Growth Fund, the Netherlands is allocating between EUR 2 021 billion and EUR 202 520 billion for targeted investments for structural and sustainable economic growth.[73] The National Growth Fund is focusing on the two areas "Knowledge Development" and "Research, Development and Innovation". The National Growth Fund has so far mobilised EUR 1.8 billion (2021-2023) for energy issues in programmes that will run over the next decade.

Under heading II, the objectives of innovation policy for energy and climate are first presented below. The competitiveness objectives are then explained under heading III.

II Promotion of clean energy technologies, long-term deployment of low-carbon technologies and related carbon transport and storage infrastructure

Innovation objectives – Energy and Climate

With its specific innovation policy on climate and energy, the Netherlands is accelerating the development process of new/improved applications that are necessary to achieve the Dutch climate targets and maintain a reliable, affordable, sustainable, safe and supported energy system. Innovation policy thus contributes to overarching policy goals that require more than just innovation, with concrete innovation missions and activities. These are regularly re-calibrated. An overview of the missions and the multiannual mission-driven innovation programmes (MMIPs) is given in Table 2.4. In these missions, we also establish links with the SET Plan and globally with the IEA and the technology cooperation links as well as Mission Innovation. For the concrete innovation goals and activities within these missions, we refer to the elaboration of the MMIPs.[74]

The biggest change in innovation objectives compared to the 2019 (innovation) missions is the recalibration in 2023 to reflect the major challenges facing the Netherlands now. Under each mission there will be one or more recalibrated MMIPs, prepared in collaboration with departments, knowledge institutions, top sectors and companies, and recalibrated in 2023 for the period 2024-2027. Changes in the social context have been taken into account. Current geopolitical developments mean that, among other things, the public authorities are stepping up their efforts to prevent strategically vulnerable dependencies. Raw materials and circularity

[71] This is a target and relates to the total Dutch R &D. budget. This is not being achieved at this stage. See Parliamentary Document 33009, No 117.
[72] Parliamentary paper 33009, No 135.
[73] The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).
[74] https://topsectorenergie.nl/nl/maak-kennis-met-tse/missies/.

important issues and particular attention has been paid to this in the recalibration exercise. In addition, the scarcity of the labour market poses major challenges for the energy sector. In order to achieve the increased climate and energy targets despite these labour market constraints, it is important to develop scale-up and standardisation concepts. Therefore, labour-saving innovations have been given a more prominent role in the revival MMIPs.

It has also been decided to refocus the MMIPs to focus less on developing individual technological innovations and more on the energy system of the future as a whole. This includes finding solutions to issues related to the integration of renewable energy into the energy system, responding to the varying availability of solar or wind electricity and making better use of existing infrastructure. This is in line with the changing policy context, where an integrated approach focused on the energy system of the future is even stronger.

In summer 2023, the Ministry of Economic Affairs and Employment issued a seventh mission to develop knowledge and innovation to develop the wider deployment of nuclear energy for the energy system in the Netherlands.

Table 2.4: Overview of missions and multiannual mission-driven innovation programmes

Missions	Intermediate targets (2030)	MMIPs Multiannual Mission-driven innovation programmes and sub-programmes		
A A full CO_2 free electricity system in 2050	• Minimum 42 TWh of electricity generated from wind and solar energy > 15 kW annually on land • 21 GW of offshore wind installed capacity achieved • 4 GW domestic electrolyser capacity, aiming for 6-8 GW	**1. Offshore renewable electricity** • Cost reduction and value option • Integrated offshore energy • Spatial, environmental and societal integration	**2. Renewable electricity generation on land and in the built environment** • Technology development and production • Spatial integration • System integration • Circularity	
Nuclear Energy Mission	• Ensuring and strengthening a future-proof nuclear (knowledge) infrastructure	• Knowledge building • Human Capital		
B A CO_2free built environment in 2050	• Insulation of 2.5 million dwellings • Phasing out bad labels • Switching to sustainable installations or heat network • Reducing the environmental impact of energy renovations • At least 20 % of local energy use within built environment generated • Increased deployment of sustainable sources	**3. Acceleration of energy renovations in the built environment** • Development of integral sustainability concepts for residential and non-residential buildings • Industrialisation of the sustainability process • Digitalisation of the sustainability process • An inclusive and attractive energy transition built environment	**4. Heat and cold** • Heat pumps • Discharge, tap water and ventilation systems • Small-scale heat storage • Sustainable heating and cooling networks • Large-scale heat storage • Geothermal • Low temperature heat sources	**5. Electrification of the energy system in the built environment** • Electrification at building level • Electrification of mobility (cross-over) • Electrification of districts of industrial sites • New frameworks for the electricity system of the built environment • Electrical infrastructure in the built environment

Missions	Intermediate targets (2030)	MMIPs Multiannual Mission-driven innovation programmes and sub-programmes		
B + Future-proof built environment in 2050	• Improving the sustainability of 7 million buildings for 2050 • New construction and transformation of at least 1 million buildings by 2030 • Replacing and renovating tens of thousands of bridges, viaducts, tunnels and locks • Significant reduction of greenhouse and nitrogen emissions by 2030 • Climate-proofing of the built environment for 2050 • 50 % reduction in primary raw material use by 2030 and a construction economy almost fully circular in 2050	**Circular construction and infrastructure** • Design (concepts, criteria and evaluation, processes), production and reuse (IFD/modular construction, validation residual capacity/quality, digital technologies) of circular constructions and components • Biobased and non-biobased circular materials • Circularity enablers (policy, procurement, chain cooperation business models, social aspects)	**Lifetime extension built environment** • Automated inspection techniques, uniform digitisation and reliable residual strength and prediction models • Measures and techniques for life extension with minimal impact on the environment • Develop, validate and implement a programme approach to lifetimeextension on a large (re) scale • Dissemination knowledge: broad sector	**Climate adaptive, nature-inclusive and environmentally conscious construction** • Building climate adaptation (warmer nuisance, drought, heat stress, summer mog, soil decoration, storm surge) • Nature-inclusive construction (biodiversity-restoration) • Environmental conscious construction such as construction process (clean and zero-emission construction programme) and construction result
C A climate-neutral and circular industry by 2050	• 50 % less primary raw materials used; • Greenhouse gas emissionsfrom process production and waste sector reduced to approximately 36 megaton CO_2eq; • Making the industrial heat system more sustainable to 300 °C is achieved through reuse and electrification; • Energy consumption per unit of product is 30 % lower than in 2020; • Sustainable hydrogen production is cost-effective compared to the fossil reference; • Using CCS cost-effectively; • In 2027, industry will be able to fully tailor choices to the expected energy and raw material system of 2050.	**6. Raw materials and products for carbon circularity** • Circularity of raw materials • Biofeedstocks for products • CCU (Carbon Capture and Usage – the capture and use of CO and CO_2 as feedstock for products	**7. Co_2– free industrialenergy** • Reduced energy dependency • Energy re-use • Replace energy carriers • Produce: electrolytic production of hydrogen	**8. Chain and system aspects** • Energy and raw materials in a new system • Infrastructure and storage • Transport and storage of CO_2 (CCS) • Digitalisation for new industry
D + Zero-emission mobility for people and goods in 2050	• Facilitating well-being rather than mobility • Accelerating the energy transition together with mobility • Mobility in a sustainable, circular world	**9.** • Increasing sustainability • Digitisation • Broader knowledge questions on how to steer the transition		

Missions	Intermediate targets (2030)	MMIPs Multiannual Mission-driven innovation programmes and sub-programmes
E Net climate neutral system of agriculture and nature	MMIP 10, 11.12 are grouped in a Theory of Change (see Head of Mission E)	**10. 11. 12.** • Methane emission reduction • Carbon sequestration in agricultural soils • Reduction of peat oxidation • Carbon sequestration in forest and nature trees • The energy transition for agriculture and • Substitution of fossil raw materials with bio-feedstocks
Cross-cutting multiannual programmes		
MMIP 13 **A robust, societal energy system worn**		**13.** • Social sub-system • Technical sub-system • Economic sub-system • Space and living environment • Complex decision-making
MMIP H2	Installation of 3-4 GW of electrolysis in 2030, preceded by 500 MW in 2025.	**H2** • Developing sustainable hydrogen chains in industry • Import of hydrogen-containing energy carriers • Application of hydrogen in heavy transport • Decentralised production and use of hydrogen in regions • Development of technology clusters for hydrogen components and chains

In addition to the climate and energy innovation programmes mentioned above; it will also focus on two cross-cutting themes that are cross linked to the implementation of all these programmes.

III Competitiveness

The objective of business policy is sustainable economic growth. This is done by strengthening the Dutch earning capacity and addressing societal challenges.

The Netherlands has the medium-term ambition to invest 3 % of GDP in RD D. The Netherlands aims in particular to stimulate private spending on research and development. It is therefore important to use public funds in such a way as to trigger the additional private R &D. Innovation is promoted, inter alia, through the Growth Fund, InvestNL, the PPP supplement, the Promotion and Development Work Act (WBSO) and innovation credit. It also increases access to capital market finance, ensures a well-established environment and attracts foreign investment, alleviating regulatory burdens and helping to seize the opportunities of digitalisation and sustainability.

The Dutch innovation policy is thus also aimed at increasing prosperity and maintaining competitiveness. Spending on research, development and demonstration of new technologies should also form the basis for new economic activities. Cost reduction in technology continues to play an important role in this. Significant steps have already been taken in a number of areas, in particular as regards the cost of renewable electricity.

National Growth Fund

The objective of the National Growth Fund is to strengthen the structural earning capacity of the Netherlands in order to contribute to sustainable economic growth. The Growth Fund invests specifically in knowledge development and in research and development.

Policies and measures

This chapter presents the policies of the 2022 Climate Policy Programme and the Spring decision-making process 2023 and 2024. The impact of the policy is described in sections four and five. Annex 2 provides an overview table of the main policy measures taken into account in the projections described in chapter four (based on the KEV2022) and five (based on the KEV2023).

3.1 Decarbonisation dimension

I Greenhouse gas emissions and removals

I Policy initiatives and measures

As mentioned above, the new government has tightened the Dutch climate targets. The intermediate target for 2030 has been increased from -49 % to at least -55 % net compared to 1990 and the Netherlands intends to focus on approximately 60 % emission reductions when designing climate policy, so that the 55 % is not affected even in the case of shortfalls.
As we have described earlier, we have a policy commitment per sector. Dutch policy is broadly divided into 5 sectors: industry, electricity, mobility, agriculture land use and built environment. For each sector, an emission reduction target in 2030 has been formulated and an indicative delegation was formulated (see Chapter 2). The main policy measures are described below by sector. We then look at the cross-sectoral policy, including the integrated approach to the energy system.

Electricity

Perspective

Electricity supply should be at the forefront of the sustainability of the Netherlands. The availability of sufficient renewable electricity is an important prerequisite for making industry, transport and services and our homes more sustainable. To cope with this increased demand for electricity, major steps are needed in the greening of our electricity sector. In addition, there is a need to rapidly reduce existing emissions – now around a fifth of our total greenhouse gas emissions. The objective is to have a CO2 free electricity sector by 2035. We also make sure that we become more independent from imports of fossil fuels from abroad.

Description of the policy

The approach and policy instruments for the electricity sector should be seen in conjunction with the transition of the energy system. This section describes the sectoral approach and policy instruments directly focused on emissions from the electricity sector. Policies aimed at the wider energy system are addressed at the following points in the INEK: Climate Fund (point 3.1.I.i) and Fiscal Greening (3.1.I.i), SDE + + (in the next section on renewable energy, point 3.1.II.iii), Energy Innovation (point 3.5.I); At the bottom of this chapter, the topics of network capacity and hydrogen.

The climate challenge will increase the role of the electricity sector in the energy system. Fossil electricityproduction needs to disappear, and making Dutch society more sustainable will largely consist of far-reaching electrification of energy consumption in businesses, mobility and the built environment. This includes both direct electrification of dwellings, vehicles and production processes, as well as indirect electrification through the scaling up of domestic electrolyser capacity. It is important for the climate challenge that electrification involves an increasing share ofCO2-free electricity produced.

The Netherlands' approach focuses on increasing the share of renewable energy from wind and solar, replacing electricity production from fossil fuels with CO2free fuels or applying CCS and CO2free electricity production from nuclear energy. Key enabling conditions for the transition are sufficient grid capacity and availability of hydrogen or other CO2free fuels for electricity generation.

In the 2023 Spring decision-making process, the government increased the ambition for the electricity sector: the objective is to have a CO 2-free electricity production intheNetherlands by 2035, which is affordable and reliable. This includes the expansion of CO2freely adjustable power, additional energy storage and additional policy on balancing energy demand. The Netherlands now depends mainly on power plants using natural gas, coal or biomass in order to have a regulated capacity. As of 2030, the production of electricity from coal is prohibited. The Netherlands is investigating what measures could be taken to ensure that existing power plants run on renewable energy carriers as soon as possible. This includes, for example, boosting the use of hydrogen. Finally, in 2035, the electricity system is completely free from CO2due to the growth of renewable green electricity and the conversion of power plants. The commitment to nuclear energy is that the new power stations will play an important role in the CO 2035 free electricity system around2. If two additional nuclear power plants are

operational around that time, the share of nuclear power will grow to more than 10 % of the electricity mix.75 We also accelerate the development of SMRs that are close to the market in their design phase. We do this by strengthening the value chain and linking SMRs' developers to the Dutch manufacturing industry. Furthermore, the Netherlands is focusing on electricity storage to incentivise batteries in large-scale solar projects. It also allows solar energy to be used if the sun does not appear and relieves the electricity grid. The Netherlands also encourages hydrogen production at sea and energy exchanges with other North Sea countries, allowing long-term storage and exchange of energy. Furthermore, the government has extended the energy saving obligation to include large consumers as of 1 July 2023.

The achievement of emission reductions in the electricity sector on Dutch territory is inherently uncertain. After the phase-out of coal, remaining emissions from the electricity sector come from gas-fired power plants. The controllable capacity of gas-fired power plants remains necessary for security of supply, but the actual amount of future running hours is uncertain.

At the same time, European reductions in the electricity sector are firmly secured through the falling emissions cap of the European Emissions Trading System (ETS), which, according to the revision following the European Commission's "Fit-for-55 package", no new allowances are issued in 2040. This should take into account rising electricity demand from other sectors. Recent geopolitical developments on European territory raise major concerns about the evolution of energy prices and security of supply. They increase the urgency of making the energy system more sustainable. Consideration is also given to high-risk strategic dependencies76 as well as circularity from the security of supply point of view of critical metals, as further elaborated in the National Raw Materials Strategy and the EU Critical Raw Materials Act (CRMA).77

Growth in renewable generation from wind and sun

The Netherlands designated three new wind energy areas for offshore wind farms in 2022 and confirmed two previously designated areas. This doubled the total planned offshore wind energy capacity to around 21 gigawatts around 2030. This is a huge challenge given the short time frame. The framework conditions for this ambition must be in place: sufficient physical and ecological space for offshore wind farms, landing and transport of the electricity produced, and sufficient demand for this electricity, especially in coastal areas near landing to reduce grid congestion. The realisation of offshore wind energy generates costs for other users in the North Sea and nature. The Netherlands aims to cover the incidental entry costs of offshore wind energy from the Climate Fund and from NextGenerationEU through the Dutch Recovery and Resilience Plan.

The ambition for onshore electricity production of at least 35 terawatt hours of production in 2030 is within reach.
Small-scale electricity production from solar panels is also growing. Growing electricity production from wind and sun reduces the need for electricity production from coal and natural gas. This is made possible by, inter alia, the regional energy strategies and the promotion of cooperative energy generation. In addition to the ETS, the Minimum CO2Price of Electricity Generation Act provides certainty for electricity producers over the long term about the minimum amount of CO2costs they have to pay, so that they can take this into account in investment decisions. In the SDE + +, the implementation of eligible production from wind on land and zon-PV (> 15 kW) is steered. In addition, the SDE + + plays an important role in electrification, which indirectly reinforces the business case of renewable generation.

Coal phase-out, gas and nuclear power

The Law on the Prohibition of Coal in Electricity Production guarantees emission reductions from the coal-fired power stations until 0 from 2030. Gas-fired power plants will continue to be needed beyond 2030 as a controllable capacity for security of supply. However, subsidies for the use of hydrogen for electricity production are planned in several years, inter alia, in rebuilt gas plants so that they can use previously CO2free energy carriers. The Netherlands also aims to contribute to the availability and cost reduction of high-quality renewable energy carriers, such as renewable hydrogen and green gas, through the use of funds from the Climate Fund. The Coalition Agreement is clear on nuclear energy: nuclear energy can complement solar, wind and geothermal in the energy mix and can be used to produce hydrogen. It also makes the Netherlands less dependent on gas imports. Therefore, in the Coalition Agreement, the government announced that the Borssele nuclear power plant will remain open for longer and that the Netherlands is also taking the necessary steps to prepare for the construction of two new nuclear power plants.78 The Climate Fund has allocated funds for nuclear power plants. In view of the discussions on CO2reduction, which are also taking place in Europe, the Netherlands is currently investigating the role of nuclear energy in the future mix in the Netherlands. A scenario study (for the period 2030-beyond 2050) looks at the relationship between different types of CO2free power, how nuclear power can be adaptable to the Dutch energy mix and cost-efficiency in relation to the system contributions of nuclear energy, in particular less land use and infrastructure investments. In addition, a market analysis of the possibilities, applications and deadlines for the

75The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).
76Parliamentary document 35982, No 9 Parliamentary letter on open strategic autonomy, and, Parliamentary Document 30821, No 181 Kamerbrief Plan van Aanpak strategische dependencies.
77Parliamentary Document 22112, No 3686 BNC fiche EU Critical Raw Materials Act.
78The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).

realisation of SMRs is carried out.

Grid capacity

Pressure on the electricity grid is increasing. The Coalition Agreement agreed to make the energy networks future-proof, to speed up, where possible, procedures for the implementation of energy infrastructure of national importance and to strengthen the implementation power of the central government and other authorities. It is important to match the growth of offshore renewable electricity production with sufficient additional demand on the mainland and to adapt the grids accordingly. Dit vergt coördinatie ten aanzien van de plannen voor extra windparken op zee enerzijds en de plannen omtrent elektrificatie in de industrie en ontwikkeling van hernieuwbare waterstofproductie anderzijds. In addition, the Netherlands is working towards a National Energy System Plan (NPE) 2050. The electricity system is part of the energy system. For the spatial planning of energy infrastructure of national importance towards 2050, the Netherlands has recently adopted the PEH.

Speeding up and simplifying procedures

The energy transition needs to be faster. This is done by using all possible means. The Government is accelerating the energy transition from a clear idea with a long-term perspective and by taking more control in the implementation of projects. This is done in various ways through a broad acceleration package. Where the energy transition needs to be strengthened in legislation or the removal of barriers is targeted at opportunities. It has been explored what legal adjustments could be made to speed up (or avoid delays) procedures for energy infrastructure projects, and thereby lead to turnaround times, by:

- Apply the project procedure to more projects. For example, for hydrogen infrastructure projects, electrolysers and the Delta Rhine Corridor (the bundle of several pipelines between the Rotterdam port, Limburgse Chemelot and the German Rhine country, with a possible branch to the port of Antwerp). In many cases, the application of the project procedure will save time in the procedures and thus lead to faster realisation of the project.
- Identify projects of major social interest which will lead to a single appeal procedure before the Council of State for these projects. **Electricity** projects from 25 kV are now considered as a category of projects. This could reduce the lead time of these projects by about 1 to 11⁄2 years. This applies only to projects which are not subject to a project procedure, as this acceleration applies.
- Amending the duty of acquiescence procedure: network operators must apply for a decision to carry out preliminary surveys on land. This has been amended by the Omgevingswet (Omgevingswet) by unifying tolerance procedures under various laws (including Wabo, Water Act). It is committed to reversing this again, as was the case under the Private Law Belemmeringenwet (by operation of law). Time gain is at least 1 years and this will lead to fewer procedures for the investigation phase.

- Acceleration in and in permit pathways and spatial integration is needed. The exploration shows that existing laws and regulations offer opportunities that can be used more frequently and in a more targeted manner, and that the greatest time gains are to be achieved here and not in amending legislation and regulations.
- Improve licensing, supervision and enforcement (VTH) through the Inter-Administrative Programme on Strengthening VTH (IBP);
- Strategic preparation of the licensing process;
- Smarter design of processes and procedures;
- Increase capacity and knowledge, for example through the MIEK expertise pool that can support municipalities and provinces in spatial integration procedures;
- Guidance for the disapplication of the National Coordination Scheme (RCR) procedure;
- Decision model for municipalities and provinces that helps them make choices to make land available for the construction of large-scale energy infrastructure.

The Environment Act, which entered into force in 2024, provides the basis for measures such as streamlining environmental and permitting procedures and one-stop shop and setting up digitalised procedures. With this Act, most of the existing individual environmental permits (except in particular nature legislation and the EIA) can be merged into one single environmental permit. This permit may be granted for projects at national, provincial and municipal level.

The key element of the Environmental Act is the Digital System Omgevingswet (Digital System Omgevingswet) (DSO). This online environmental permit platform designates permit applicants by answering a few questions to the appropriate competent authority and sets out the requirements (content and form) for a successful application for a permit.
The platform will connect competent authorities with the licence applicant. This DSO thus acts as a digital procedure for the Environmental Act and acts as a national one-stop shop for environmental permits.

Industry

Perspective

A climate-neutral, circular industry is an important driver of the Netherlands' earning capacity and can further increase this role. Industry now contributes above average to innovation, productivity and quality jobs. At the same time, it is also the most emitting sector. In the energy transition, industry can play a flywheel role and play a central role in the transition to a circular economy. The Netherlands supports a significant industrial base as part of a diversified economy. Industrial production remains at 10-15 % of Dutch GDP.79

Description of the policy

In order to achieve the industrial reduction obligation for 2030, the Netherlands uses a different policy mix, in line with European climate policy. The rationale for this policy mix is firstly that the sustainability of industry should take place here and not elsewhere, as sustainable industrial production is important for the future-proofing of the economy and contributes to strategic autonomy. Investments elsewhere can lead to the relocation of emissions abroad, which does not contribute to the global climate challenge. Secondly, the Netherlands' vision is that making industry more sustainable will act as a driving force for the wider energy transition and the transition to a circular economy. Industry's demand for renewable energy carriers makes investments in new wind farms and infrastructure profitable, which will also benefit other sectors.

Climate policy for industry therefore includes not only pricing and standard-setting measures, but also support to make the transition. This includes subsidies for sustainability and innovation, by promoting the timely availability of renewable energy and raw materials and the necessary infrastructure. With the largest emitters, EZK has been implementing tailor-made support arrangements since 2 022 in exchange for additional emission reductions and other over-regulatory environmental performance. This does not mean that all companies will be more sustainable. The Netherlands accepts that companies that do not want or cannot make this transition will eventually disappear.

Public authorities are creating the framework conditions for companies to make the transition and allow new sustainable businesses to enter the market. Setting up the right framework conditions is a complex interplay of different parties, in which the government must take a regional role. To accelerate the climate and energy transition, a National Programme for the Sustainability of Industry (NPVI) was decided in March 2023. Departments and local and regional authorities work with grid operators, clusters and industrial representatives to solve bottlenecks (such as speed of permitting), articulate demand and supply for renewable energy and infrastructure in the industrial clusters, and steer projects. Implementation of the programme started in April 2023, under the auspices of a national steering group led by the Minister for Economic Affairs and Climate Policy. An important part of the NPVI is the approach through the industrial clusters. For the five geographical clusters and cluster 6, a cluster director has been appointed to promote cooperation between government, industry and network operators. Cluster directors shall report to the national steering group.

According to the Environmental Planning Agency (PBL) and its Climate and Energy Outlook 2023 (KEV), industry is on track to achieve the 2030 climate targets, as long as maximum efforts are made to develop and implement climate policy plans (both planned and on the agenda). The residual mission target for industry is 29.1 megaton CO_2 eq, while the range is 27-42 megaton CO_2eq. However, this is still subject to considerable uncertainty, in particular as regards the achievement of framework conditions that industry needs to make it more sustainable, such as sufficient and affordable supply of renewable energy, timely availability of permits and infrastructure. This is the main challenge of the NPVI. The commitment is to monitor the competitiveness of industry and to work towards greening in the Netherlands so that emissions do not leak to other countries. For this reason, the Netherlands encourages the sustainability of businesses with supporting tools and is working on putting the framework conditions for sustainability into line with the NPVI. Attention is also paid to the industry that is not located in the big 5 industrial clusters. For these so-called "Cluster 6" companies, support has been organised within the NPVI and a cluster 6 action plan has been prepared to identify and remove concrete bottlenecks to sustainability.

Co2levy and CO2 minimum price

Climate policy assurance for the industrial sector (including waste treatment) has been achieved through the national CO2levy, in addition to the European ETS. It provides certainty on the emission reduction target for 2030.
The design of this levy (with rising rates and decreasing, tradable dispensation rights) gives flexibility and time to make the necessary investments. This reduces the risk of leakage. The climate will not benefit from the relocation of activities and emissions abroad. The Netherlands is setting up the CO_2 levy to ensure the increased ambitions for industry. The Coalition Agreement also agreed to introduce a CO2minimum price for industry. This minimum price was introduced on 1 January 2023 and ensures that a minimum price is applied to the exempt rate of the CO2levy. The 2024 tax plan includes a legislative proposal to increase the price path of minimum prices. This bill was part of a broader package (Tax Climate Action Act for industry and electricity). This package was rejected by the Eerste Kamer.
The government waives the increase in the CO_2 minimum pricefor industry and electricity production, due to the possible accumulation of burdens expressed by the House of Representatives in the Bill on fiscal climate measures for industry and electricity.

In the Spring decision of April 2023, it was agreed that the government will take measures to ensure that the 4 megatone under the CO2levy

79Parliamentary paper 29826, No 147.

agreed in the Coalition Agreement is met. To this end, the 2023 Tax Plan reduced the number of dispensation duties by announcing that the 2025 Tax Plan increases the rate of the CO2levy on the basis of a new tariff study by PBL.80 In its tariff study on the increase of the CO2levy at different levels, the PBL identified the likely effects on the CO2reduction and the levy burden on industry. In this study, the PBL states that the rate of the national CO2levy for industry should be increased to EUR 309 (2024 price level) per tonne of CO2, in order to achieve with certainty the agreed 'charging target' (26.9 megaton), provided that the framework conditions, such as (energy) infrastructure and the speed of the permit granting process to be carried out, are in order. In doing so, the PBL states that an increase in the tariff leads to additional CO2reduction, but at the same time may negatively affect the international playing field (including within the EU) and increase the risk of leakage. Such potential carbon leakage effects cannot be taken into account in the model. The PBL also states that, instead of increasing the tariff to EUR 309/tonne of CO2 (2024 prices), the government may consider increasing the rate more moderately and implementing the most expensive sustainable measures through tailor-made agreements and subsidies. The Cabinet's proposal is in line with this. Indeed, in order to take into account the business perspective, the government decided in the April 2024 Spring decision to maintain the current price path in the CO2levy until 2028. From 2028 onwards, the CO2levy for the first 50 kton of taxed emissions (after deduction of dispensation allowances) will continue to follow the current tariff path, but above the CO2levy will rise to EUR 216 in 2030. As a result of this design, the increase in the rate applies only to a limited number of companies; the largest emitters, almost all of which are also eligible for a tailor-made approach.81 As a result, almost all cluster 6 companies remain free from the impact of this tariff increase. This is important because these companies often have less prospects of action to make them more sustainable in the coming years, often due to missing framework conditions, such as (energy) infrastructure. The government therefore wanted to protect these companies.

Carbon Capture and Storage

The Netherlands sees Carbon Capture and Storage (CCS) as a necessary and effective solution to achieve CO2emission reductions in sectors where affordable sustainable alternatives are not (yet) available in the short term. CCS also plays an important role in the process of carbon capture. In this context, it is important that the commitment to carbon removals is not to the detriment of efforts to reduce greenhouse gas emissions. When analysing the necessary carbon capture and storage capacity, it is necessary to address both fossil and non-fossil CO2.82 In the National Energy System Plan, the government has already indicated that policies are in place, preferably at EU level, to create the right incentives for carbon removal. The details of carbon removal policies are further developed in the context of the 2024 Climate Plan and, at the request of the House of Representatives,83 a Carbon Removal Roadmap.

The Dutch government has no set target for CCS. However, the *Net Zero Industry Act* introduces an obligation of 50 megaton per year CO2 injectioncapacity for 2030 within the European Union.84 In addition, the recent European Communication on the EU Industrial Carbon Management Strategy, in which the European Commission announced its commitment to facilitate CCS, CCU, carbon removal and well-functioning CO2transport infrastructure. The Netherlands supports the approach of this strategy. This Communication foresees a significant scaling up of European storage and injection capacity. Dutch policy aims to provide incentives for the market to choose the most cost-effective emission reduction measures. The amount of storage space that can be developed for 2030 depends, inter alia, on market interest and the speed of permitting procedures. Based on publicly announced industry initiatives to develop CO2storage sites in the North Sea, annual injection capacity is expected to come to the market by 2030 10-15 million tonnes. In the Netherlands, several CO2 infrastructureprojects are currently under development, at different stages of maturity. The Porthos project took a final investment decision in October 2023 and is currently in the construction phase. Porthos is planned to capture and store from 20 262.5 megaton CO2 per year. The parties of the Aramis project took the investment decision to implement the front-end engineering design (FEED) phase of the project. Finally, Yara Sluiskil made an investment decision on its CCS project in November 2023 and concluded a final contract with Northern Lights to store CO 2 025 in Norway from the beginning of2.

The Netherlands supports the development of an integrated European CCS market. The Netherlands has ratified the amendment to Article 6 of the London Protocol and implemented the ETS and CCS Directive. The Netherlands therefore meets all the requirements for cross-border transport of CO2 for permanent geological storage between EU and EEA countries. This is confirmed by three MoUs signed by the Netherlands on this subject with Belgium (June 2023),85 Denmark (2023)86 and Norway (April 2024) respectively. Cross-border infrastructure projects with

80The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).
81The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).
82Parliamentary paper 22112, No 3917.
83Parliamentary document 32 813 No 1243.
In84 February, the European Commission, the European Council and the European Parliament reached a provisional agreement on the Net Zero Industry Act. This obligation still needs to be further developed.
85Memorandum of Understanding Belgium – The Netherlands on cross border transportation of CO2 with the purpose of permanent geological storage (June 2023).
86Memorandum of Understanding Denmark – The Netherlands on cross border transportation of CO2 with the purpose of permanent geological storage (October 2023).

Projects of Common and Mutual Interest (PCI/PMI) status include Aramis, EU2Northsea, Delta Rhine Corridor and Northern Lights.

The Netherlands already has an overview of the theoretical CO2storage capacity (approx. 1.600 megaton) on the Dutch continental shelf. More accurate estimates are needed to identify the commercial capacity. This is usually done by parties developing commercial CCS projects.

CCS is expected to make the main contribution to the emission reduction targets in the industrial sector. The industry delegation target is 29.1 megatonnes. Based on techno-economic calculations, the largest contribution is the capture and storage of CO2, with approximately 9 [5-11]87 megaton CO2emission reductions per year.
Co2capture and storage mainly takes place in chemistry, refining, ammonia production and waste incineration plants (AVIs).88 Recently announced policy targets to achieve carbon removals (0-3.5 megatons in 2030) could increase national needs for CO2storage capacity.

The Netherlands encourages the application of CCS mainly through the Stimulering Duurzame Energieproduktie en Climate-Transition (SDE + +) subsidy scheme. The SDE + + grants to companies and non-profit organisations that produce large-scale renewable energy or reduce CO2emissions. For CCS projects, successful applicants may receive funding for the unprofitable top of their project. Put simply, the SDE + + covers the financial gap between the ETS price and the marginal emission reduction costs associated with the construction and operation of the CCS project.
The SDE + + covers the capture, transport and storage of CO2. The subsidy is granted to the issuer and also owner of the capture facility, but also includes an amount for the transport and storage costs that can be paid to a third party for such services.

Annual liability of RFNBOs in industry

The government is exploring the possibilities for an annual obligation of RFNBOs in industry for hydrogen from renewable sources, starting from 1 January 2026, as one of the tools to ensure that the Netherlands can meet the binding target set out in Article 22a REDIII for the use of RFNBOs in industry. This annual obligation is a tool to require the use of renewable hydrogen and renewable hydrogen carriers (RFNBOs) among industrial hydrogen users to achieve part of the imposed REDIII target. In general terms, the obligation should operate as the annual energy obligation for transport, allowing tradable rights companies to fulfil the obligation. The annual obligation should provide sufficient flexibility for the start-up market in the first years, addressing inter alia the availability of and access to renewable hydrogen (carriers) by industrial users, the phased establishment of the relevant infrastructure and the avoidance of crowding out alternative, more cost-efficient sustainability routes. In 2024, the format of the annual commitment will be consulted, including the migration path (percentage path) and flexibility mechanisms. In order to determine the basis for this annual obligation – and also to achieve the REDIII objective – it is necessary to clarify from the European Commission the hydrogen flows that may be exempted on the basis of Article 22a REDIII and the ammonia recital in this Directive.

Demand subsidies

The above mentioned annual obligation RFNBOs in industry partially implements the achievement of the REDIII industrial target imposed on Member States. The remaining part of this statement is intended to be filled in by means of a form of demand subsidies.89 90 91 92 93 94 [91929394]

Intensification of generic grant instruments

The various subsidy schemes available to support innovative sustainability of industry have proven in recent years to play a crucial role in achieving sustainability. Within industry, around 60 % of the subsidy budget of the various schemes goes to SMEs.

For industry, the Stimulering Sustainable Energy Production and Climate Transition (SDE + +), the Demonstration of Energy and Climate Innovation (DEI +), the Accelerated Climate Investment Industry (VEKI), and the Energy Studies TopSector (TSE), Energy Investment Deduction (EIA), Environment Investment Deduction (MIA), Willefinige Installation of Environment Investments (VAMIL) and the Allowance Scheme for the Upgrading of fully renewable hydrogen production through electrolysis (OWE) are important schemes. These schemes are being further optimised. In addition, the possibility and desirability of supporting industrial parties that switch or switch to the use of renewable hydrogen shall be explored.

The NIKI (National Investment Scheme for Climate Projects Industry) is a subsidy scheme to roll out innovative techniques in green

87This is the range.
88PBL (2022), Climate and Energy Outlook 2022, The Hague: Environmental Planning Agency.
89Parliamentary paper 32813, No 1049.
90Parliamentary paper 32813, No 958.
91Parliamentary paper 32813, No 1060.
92Parliamentary paper 32813, No 1143.
93Parliamentary paper 32813, No 1272.
94Parliamentary paper 32813, No 1314.

chemistry or electrification on a large scale in industry. The NIKI scheme will support larger sustainable investments, using these techniques, with a subsidy for the early years. The plan aims at publishing the NIKI in the second half of 2024, after which a first opening can take place. An amount of EUR 2 024 million was allocated for the first NIKI opening through the 228 budget. In addition, an amount of EUR 1 billion has been set aside for subsequent opening.

Maintaining a level playing field

It is important that there is an international level playing field so that companies in the Netherlands invest in making them more sustainable and there is no carbon leakage. The following measures shall be taken to prevent carbon leakage:

1. The instruments shall be designed in such a way as to minimise the risk of leakage of activity and CO2 emissions, as agreed in the Climate Agreement.
2. In order to capture the impact of the measures, a play field test was carried out again in 2024, building on the tests from previous years. This year explicitly highlights the high electricity costs faced by companies in the Netherlands.
3. Be in line with the European level playing field, such as greater harmonisation by the EU Energy Taxation Directive and the introduction of a CO2border price through the Carbon Border Adjustment Mechanism (CBAM). The CBAM ensures that there is the same CO2price for products on the European market, regardless of where they were produced. This encourages the sustainability of businesses and countries outside Europe and prevents carbon leakage. In 2026, the European Commission will carry out an evaluation looking at whether other sectors could be added to CBAM.

Managing and accelerating the implementation of sustainable infrastructure

Timely realisation of energy and raw materials infrastructure is a critical prerequisite for achieving climate goals and maintaining earning capacity for existing and new industries. Therefore, the Dutch government is managing infrastructure projects of national and provincial interest through the Multiannual Programme for Infrastructure for Energy and Climate (MIEK, see point 3.1.I under the electricity sector) and the Provincial MIECs (pMIEK). The (p) MIUK project overview shows a gap between the desired realisation dates of the industrial clusters and the network operators' planned pre-planned commissioning dates over the full breadth of projects. Lead times of procedures, nitrogen and sufficient implementation capacity prevent timely construction. The Netherlands is working to remove these barriers. Together with industry, grid operators, energy producers and co-public authorities, work is ongoing on ways to bring the desired industrial implementation dates closer to the planned deployment dates of infrastructure. By the third quarter of 2024, each industrial cluster will deliver a new Cluster Energy Strategy and a provincial Cluster Energy Strategy will be delivered to identify the energy demand over time and the energy infrastructure projects needed.

Customised arrangements for major industrial emitters

The Coalition Agreement announced the tailor-made approach to further accelerate the sustainability of industry: the government offers the largest industrial emitters in the Netherlands the possibility of the so-called tailor-made approach. This can offer tailor-made support for sustainability in the Netherlands. In addition to agreements on additional and faster reduction of CO2, agreements on improvement of the living environment are also made where relevant, with particular attention to nitrogen reduction. With the tailor-made approach, the government aims to help ambitious industrial emitters to make them sustainable within reasonable and fair terms and to ensure that they continue to invest in the Netherlands.
This will make it possible to strengthen the establishment environment and maintain sustainable employment for the Netherlands.

In the case of customised arrangements, the starting point is reciprocity. In order to benefit from the tailor-made approach, the company must have ambitious plans to make it more sustainable in the Netherlands. Companies should be prepared to commit to additional greenhouse gas savings beyond the reduction that they are already expected to achieve under the CO2levy. If a company is willing to make an additional effort as part of the tailor-made approach to achieve the Dutch climate targets, to achieve nitrogen reduction and to improve other aspects of the living environment, the government would like to see whether it can also do some extra measures to facilitate the projects in question.
This could include supporting both reducing or removing non-financial uncertainties (e.g. supporting timely availability of energy infrastructure and a predictable permitting process) and reducing or removing financial uncertainties (for example, a contribution to the unprofitable top in the business case).

The tailor-made approach focuses primarily on the largest industrial emitters.95 The discussions currently focus on fifteen of these companies; the remaining companies are waste incineration plants (AVIs) that have a separate approach, and we are also in contact with the offshore sector. Two-thirds of industrial emissions come from these fifteen largest industrial emitters: these farms fired around 2 021 megatons in 35. They should reduce their emissions by 16 megatons to 19 megatons by 2030; this includes the additional reduction of 3.5 megatonnes for these companies due to the customised approach, in addition to the reduction they have to achieve with the CO2levy. In

95The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).

the August 2023 decision-making process, it was decided to offer the tailor-made approach to companies outside the top 20. With three companies from the top 20 largest industrial emitters, including two cluster-6 companies, a tailor-made pathway has been launched. This should together lead to an additional reduction of 0.3 megatons in 2030. In the tailor-made approach to the largest industrial emitters, the starting point is that financial support for the sustainability of companies is provided as much as possible through generic subsidy schemes such as the SDE + +, NIKI and VEKI. If the generic toolkit is not appropriate for the project and/or business case in question, tailor-made subsidies and/or financing could be considered. EUR 750 million has been set aside in the customised lot in the Climate Fund, of which EUR 200 million is earmarked for Nobian. In addition, the 2025 MAP adds EUR 229.6 million as part of the parcel increase, as agreed in spring 2023.

Eleven *Expressions of Principles (EOPs) and one Joint Letter of Intent (JLoI*) were signed at the time of writing (1 May 2024). These plans could bring about 13 megatons of CO2reduction by 2030.

Making SMEs more sustainable

In addition to the tailor-made approach of the largest CO2 emitters, the Netherlands is putting the cluster approach in the five major industrial clusters as well as the Cluster 6 approach on making the large SMEs more sustainable. In addition to the measures under the energy savings obligation, SMEs can achieve significant CO2reductions. To this end, the Netherlands supports SMEs in three areas: the sustainability of the business process, the sustainability of business mobility and the sustainability of the farm building. This support is designed through four types of support:
1. *Information, inspiration and* knowledge building to disseminate and share knowledge on how to make it sustainable. 2. *Research and development* to enable innovation within SMEs to enable new ways of sustainability. 3. *Encouragement* to (better) enable the uptake of sustainable techniques in SMEs. 4. *Standardisation* where clear standards support SMEs by making clear when to take. For all these forms of support, there is a wide range of schemes, programmes and standards.

However, it can be seen that the volume of regulations, programmes and standards is sometimes an incomprehensible whole for entrepreneurs. The Netherlands is therefore working in the coming period to better understand the overlap and possible competition between schemes and programmes to support the sustainability of SMEs. The aim is to make support for SMEs more effective and efficient.

At the same time, many sustainability interventions also require the achievement of various enabling conditions, such as access to infrastructure, affordable sustainable energy and finance, legislation and regulation, R &Dsupport and availability of skilled staff: very similar to the framework conditions for larger farms. By focusing on the creation of these framework conditions, the Netherlands aims to support SMEs in making them more sustainable.

Circular Economy

The transition to climate neutrality and a circular economy are closely linked. The perspective is an economy that helps to combat climate change, but also to improve biodiversity, to a cleaner living environment, and to the security of supply of raw materials. Indeed, the scale and pace of global extraction of raw materials is unsustainable and leads to an overshooting of planetary boundaries. In February 2023, the Ministry of Infrastructure and Water Management sent the National Programme for Circular Economy 2023-2030 to the Chamber. The programme is of interest to industry. Indeed, using less virgin raw materials and reusing raw materials, and replacing fossil raw materials with renewable raw materials is essential for industrial sustainability and leads to a reduction of CO2 emissions throughout the chain, both in the Netherlands and elsewhere. Part of this programme is to stimulate and create sustainable, circular growth and end markets.
2. The coherence and connection with Circular Economy is being further developed, building on the NPCE.
3. Market demand for emerging techniques is stimulated by promoting more source-based policies in Europe, such as mandatory recycling shares and sustainable circular (bio) raw materials. The Netherlands will explore the possibility of strengthening market incentives to make reuse and renewable raw materials competitive. Standard-setting and market incentives are determined at EU level.
4. Regulatory barriers are also being examined. Removing regulatory barriers is an important enabling condition to get circular production processes off the ground.
5. Policies are being developed for sustainable industrial growth markets, for example in the case of plastics. In the Coalition Agreement, the Cabinet agreed that there will be a mandatory recycling rate in building materials. In addition, the Netherlands is setting ambitious rates of renewable or recycled raw material use in Europe for certain product groups.
6. The tailor-made arrangements address circular economy and Scope 3 emissions reduction where relevant. It also promotes better rewarding Scope 3 emissions reduction in European and international instruments and climate targets.

In anticipation of EU legislation, a national obligation for plastic producers to incentivise the uptake of recycled or bio-based plastics will be introduced as of 2027. The intention is to increase the obligation to 25 % -30 % plastic recycling or bio-based plastic by 2030. This also explicitly takes into account the competitive position of parties in the chain in relation to Member States where no national obligation applies. This obligation applies to all plastics produced in the Netherlands and for the Dutch market. Exports are therefore excluded. From

the Climate Fund, the Netherlands will support companies in this transition to a circular plastic chain. In addition, the waste incineration plants (AVIs) still emit a lot of plastic that can also be recycled, resulting in the loss of usable raw materials and the unnecessary emission of greenhouse gases. The Netherlands therefore targets more plastic sorting, further pricing of waste incineration (including plastic) by AVIs, combined with subsidy, and application of negative emissions (CCS) where appropriate. Finally, additional money will be available to scale up circular innovations to further support the circular transition.

Mobility

Perspective

In 2050, Dutch traffic and transport no longer emit harmful exhaust gases, including CO2, which is good for climate, nitrogen and health. This requires a change in travel behaviour, moving towards cleaner transport. In doing so, it is necessary for the Netherlands to have sufficient access to transport for poor and rich, young and old, disabled and less valid. Combating climate change must therefore go hand in hand with achieving zero-emission transport for all Dutch people.

Description of the policy

Sustainable mobility policy is based on four pillars: (1) active mobility and more sustainable passenger mobility, (2) electric passenger cars, (3) logistics and (4) strengthening sustainable fuels.

Active mobility and making people more sustainable

The Coalition Agreement mobilises up to EUR 2 030 265 million for the greening of passenger transport and travel behaviour and then structurally EUR 29 million per year. In the coming months, the government will draw up an integrated, multi-faceted plan. The impact of this measure will be in line with the most recent:

IPCC report (highlighting the importance of behaviour in the climate transition) focuses on making travel behaviour more sustainable. It focuses on taking all groups and sectors into account in making their behaviour more sustainable. Special attention is paid to support and careful handling of target groups. Greening of passenger transport focuses not only on work-related mobility but also on recreational journeys. Recreational movements are based on “less CO2, but not less recreation”, in close cooperation with the industry. The Netherlands is also working on the policy that has been put in place. The Netherlands also continues to promote cycling and walking in line with the IenW-Fietsamtie 2022-2025 and the National Foresight picture Fiets 2040 drawn up in Tour de Force. This is done by the Netherlands, for example, by contributing EUR 780 million from the central government to cycling and walking of new housing sites and contributing structurally to a nationwide network of cycle routes. And through the ‘Kort ritje?’ campaign Cycling!’ and the commitment to Fietsambassadeurs and Doortrappen to promote behavioural change.’ A Citydeal Fietsen *for* everyone is also working with various partners to make cycling accessible to all.

The Netherlands is accelerating the uptake of zero-emission passenger cars by increasing the CO2target for work-related passenger mobility. In the Spring decision of 26 April 2023, the CO2 target for the decision CO2 reduction in work-related passenger mobility was increased from 1 to 1.5 megatons in 2030. This encourages employers to encourage the use of EV, OV or bicycle for both business and commuting. The decision will take effect on 1 July 2024.

Electric passenger cars

The Netherlands is committed to the timely deployment of sufficient and smart charging infrastructure. Part of the Climate Fund has been made available for the deployment of charging infrastructure for mobility. However, additional resources are needed to achieve all charging infrastructure targets and accelerated electrification. The connection with energy infrastructure is also important here. In the EU, the Netherlands is also working on ambitious charging infrastructure obligations to enable cross-border electric mobility. The Netherlands is also working on a policy already underway, such as the Subsidieregeling Elektrische Personenauto Particulieren (SEPP). It is intended to help citizens switch to a new or second-hand electric car between 2020 and 2024. The National Climate Agreement’s ambition to stop selling new cars with internal combustion engines five years earlier than the European Commission is expected to be missed. However, the Netherlands remains committed to strengthening current European vehicle standards, including intermediate targets by 2030. In doing so, the Netherlands still advocates phasing out new fossil vehicles in 2030, five years earlier than the 2035 proposed by the European Commission. We also continue to focus on behavioural influence and communication, as it appears that misconceptions and uncertainties about electric cars can hinder the switch to electric driving. Finally, the Netherlands is accelerating the uptake of zero-emission passenger cars by increasing the CO2target for work-related passenger mobility. This encourages employers to encourage the use of EV, shared mobility, public transport or bicycle for both business and commuting.

In the 2024 Spring decision-making process, the government decided to correct the motor vehicle tax (MRB) for the higher weight of electric passenger cars. At present, owners of zero-emission vehicles do not pay any motor vehicle tax (MRB) and a quartz rate as of 1 January 2025. From 1 January 2026, this reduction will end, which means that the MRB of a zero-emission passenger car will be higher

than the MRB of a similar petrol car. This is because the basis of the MRB is largely based on the weight of the vehicle and zero-emission passenger cars due to the weight of the battery are heavier than comparable fossil cars. A new tariff reduction for zero-emission passenger cars is introduced in the MRB of 40 % in 2026 2027 and 2028, 35 % in 2029 and 30 % in 2030. The tariff reduction applies both to the national part of the MRB and to the provincial centres and expires after 2030. This measure makes the purchase of both new and second-hand electric cars more attractive to many people.

Road transport logistics

The BPM 1992 Act abolishes the exemption for a merchant delivery vehicle (business exemption) with effect from 1 January 2025. The exemption in the BPM for zero-emission vans remains in place. The specific focus in the Coalition Agreement and additional funding for sufficient charging infrastructure as described above for electric passenger cars also applies to the logistics sector, public transport by bus, Doelgroup transport and construction. The Netherlands is also working on the logistics pillar to introduce zero-emissions zones for urban logistics. In addition, the Subsidieregeling Emissielloos Bedrijfsauto (SEBA) scheme, the Zero Emission Trucks purchase subsidy (inception) and the Zero Emission Touringcars purchase subsidy is under way. In addition, there is a major effort in the area of public and private charging infrastructure subsidy schemes and the implementation of the Eurovignette Directive in the HGV charging is ongoing.

On 30 October 2023, the Schoon and Emissieloos Bouwen Agreement was signed by 45 parties.96 In this memorandum of understanding, the Government of the Netherlands, co-public authorities, industry and network associations in the construction sector and building contractors agree on how to make construction equipment more sustainable. This includes the application of emission requirements for construction equipment to contracts for construction, maintenance and demolition projects. More than EUR 1 billion is available to support actors in the transition through the different instruments under the SEB programme. Through the Subsidieregeling Schoon en Emissieloos Bouwateriel (SSEB), the Netherlands helps to build their equipment, vessels and vehicles more sustainable. There is also a Knowledge Programme focusing, for example, on the impact of construction site developments on material use, such as prefab, other material use or digitalisation. Funds are also available for contracting authorities and ProRail and for co-public authorities that have signed up to the SEB Covenant.

For heavy and freight transport, the Cabinet makes performance agreements with the transport sector on the reduction of CO2emissions. The Netherlands is also committed to making inland waterway transport more sustainable – by introducing an emission label and pricing fuels through ETS2. The Netherlands wishes to help the transport sector in this endeavour and makes funds available for the purchase of heavy-duty electric vehicles through a return lock of the truck tax.

Sustainable energy carriers

The Netherlands is pushing for fossil fuels to be increasingly replaced by biofuels, RFNBOs97 (such as renewable hydrogen) and renewable electricity in mobility. For biofuels and RFNBOs, we see a priority in the heavy-duty road transport, maritime and aviation sectors. For renewable electricity, we give priority to the small road transport sector and it will also be possible to fill part of heavy road transport. The Vision for Renewable Energy Suppliers defines which energy carriers will supply energy in the short, medium and long term. The National Energy System Plan sets out how energy needs and carriers can be reconciled until 2050.

The government chose to extend the refinery route in the 2024 Spring decision-making process. The use of renewable hydrogen in refineries may count under certain conditions towards the RFNBO sub-obligations that fuel suppliers receive to the mobility sector, in addition to direct use of (fuels based on) hydrogen in road, maritime, inland waterways and aviation. In this context, direct use of (fuels based on) hydrogen in mobility will always be more rewarded by the use of one or more correction factors when deployed via the refinery route in the different mobility sectors. This correction factor (s) shall be determined by an external study. The use of renewable hydrogen in refineries will never compete with the deployment of biofuels or renewable electricity in the mobility sector and can only be used to contribute to the RFNBO sub-obligations.

Sustainable energy is promoted at European level (including through the Renewable Energy Directive [REDIII98]). By 2030 (and beyond), the share of renewable energy in the mobility sector needs to grow significantly. The entire mobility system (road, inland waterway, maritime and aviation) in the Netherlands is expected to require some 2 030 petajoules of renewable energy in 180. Some 2 022 petajoules were delivered in 65. The entire mobility system requires some 2 030 petajoules by 935.

In order to meet the European objectives set out in the REDIII, the Netherlands is reforming the Energy Transport system. This is a trading system, in which fossil fuel suppliers will be obliged to reduce a certain percentage of CO2chain emissions. They can do so either by supplying renewable energy themselves, or by purchasing credits from parties that have supplied renewable energy to the transport market.

96Parliamentary paper 31209, No 246.
97Renewable fuels of non-biological origin; renewable fuels of non-biological origin.
98Into the English *Renewable Energy Directive*.

The reform increases the obligation on fuel suppliers to meet European targets. The Netherlands has agreed to take an additional step on top of the European targets. As much of the current road traffic is fuelled by fossil fuels in the coming years, this national ambition increase will increase the use of biofuels in road transport. As electrification continues, an increasing share of this will be used by transport with few alternatives, such as heavy road transport.

The reform will change a number of things. Firstly, fuel suppliers are obliged to reduce CO2chain emissions. Previously, they were obliged to supply a certain share of renewable energy. By focusing in future on CO2 chain emissions, the Netherlands is directly driving the target. In addition, the Netherlands encourages the use of the best forms of renewable energy, such as renewable electricity, advanced biofuels or renewable hydrogen. Secondly, fuel suppliers have a separate obligation for different modes (road, inland waterway, maritime and aviation). By doing so, we make sure that the entire moblity sector is preserved. Thirdly, the Netherlands increases the possibility to trade renewable electricity credits to fuel suppliers with a CO2 chain emission reductionobligation. Fourth, the system limits the scope for refineries using renewable hydrogen in the production of fuels to be able to trade credits for that purpose. As of 2026, the reformed system will enter into force.

When reforming the Energy Transport system, special attention is paid to promoting advanced biofuels and RFNBOs, for which REDIII has included a sub-target. The system translates this into sub-obligations for the deployment of RFNBOs for the land, inland waterway and aviation sectors, and a sub-obligation for the deployment of advanced biofuels in the land sector. The aim is to incentivise both energy carriers and ensure the achievement of both the combined sub-obligation and the minimum level for renewable fuels of non-biological origin in 2030.

In addition to the Energy Transport system, renewable energy carriers are also incentivised through a subsidy scheme to boost hydrogen in mobility (SWIM). This subsidy scheme promotes a nationwide network of hydrogen refuelling stations. Linked to this, a subsidy may be requested for the purchase of hydrogen vehicles.

The Netherlands is also working towards achieving the objectives (including through the SWIM) as set out in the European Alternative Fuels Infrastructure Regulation (AFIR). This Regulation lays down, inter alia, requirements on where and how many alternative recharging and refuelling infrastructure should be provided along major routes and in the urban nodes as specified in the TEN-T. The Emissions Trading System for buildings, road transport and other sectors (ETS2) provides a decreasing cap on road transport emissions in the EU. According to the PBL, the corresponding impact on the final consumer is 12 cents per cubic metre of natural gas and 12-14 cents per litre of petrol and diesel respectively in 2030. At this price level, the ETS2 according to the PBL for the built environment and road transport could together produce up to 1.25 megatons of CO2reduction.

More and more transport will take place in the Netherlands. This requires batteries. In order to ensure the safe, responsible and sustainable use of batteries in society and to make smart use of the opportunities, a nation-wide coordination has been put in place. This includes promoting circular batteries, improving safety and improving national and international cooperation.

Shipping

The Netherlands has one of the largest maritime sectors in Europe. This requires our country to make a significant contribution to the European challenge of sustainability, but also offers opportunities. With its knowledge and innovation power, our country can become a frontrunner in sustainable techniques, and into a turning point in the production and supply of sustainable (marine) fuels.

In early December, the Cabinet presented the National Energy System Plan (NPE) to the Lower House.99 Through the NPE, the government has identified how the energy system of the future should look like for an climate-neutral society and what is needed to come there. The NPE has also identified energy needs from all sectors, including maritime and inland waterway transport. For maritime transport, the NPE explained that biofuels have an important role to play in the transition path. It is also stated that carbon fuels in maritime and aviation are expected to remain essential at least until 2050 due to the need for high voluminous energy density. In addition, it has been stressed that there is still a lot of uncertainty about the feasibility of ammonia as marine fuel.

For inland waterway transport, a broader mix is available. There is a small scale of electricity hazards, through hydrogen and interchangeable batteries. These techniques should be scaled up in the coming years. Renewable fuels will therefore play an important role in achieving the objective of zero-emission inland waterway transport by 2050.

Maritime and inland waterway transport are sectors operating internationally. Therefore, the government is working on ambitious policy instruments at international level to maximise the impact while maintaining the level playing field.

99Parliamentary paper 32 813, No 1319.

By letter of 29 January 2024, the House of Representatives was informed of the progress of climate policy in the maritime sector.100 For maritime transport, there has now been an agreement at EU level on regulating GHG intensity on board ships (FuelEU Maritime) and the pricing of greenhouse gas emissions from the inclusion of maritime transport in the EU Emissions Trading System (ETS) entered into force on 1 January 2024. For inland waterway transport, the Netherlands decided in the 2024 Spring Decision to make use of the opt-in for ETS2, which links a price to CO2 emissionsthrough the fuel suppliers. The International Maritime Organisation (IMO) redesigned the climate strategy in July 2023 and is now working towards corresponding measures at global level.
As in the EU, the Netherlands is withdrawing it with other ambitious countries. Within FuelEU Maritime, the use of shore-side electricity will be mandatory for larger container and passenger ships from 2030, while within the AFIR there will be an obligation for the provision of shore-side electricity in TEN-T ports for these ship segments. EU instruments are expected to play a sufficient role in the energy transition only after 2030. However, in order to reach the 2050 climate neutrality target and prepare the sector for it, an acceleration of the transition is already needed. In the coming year, the Netherlands, together with the sector, will consider how this can be achieved and what additional impetus is needed. To support this, a project has recently been funded by the National Growth Fund to have 45 battery electric inland waterway vessels and 12 charging stations by 2026. The NGF application for a Maritime Master Plan has also resulted in an award of EUR 100 million unconditionally and EUR 110 million conditional, in addition to investments from the market. The Maritime Master Plan provides demonstrations of other fuels (hydrogen, methanol and LNG carbon capture) on board ships in the coming years, and a learning effect by sharing the results of these demonstrations. These demonstrations are a first step, but more will be needed in the coming years to make the path towards an climate-neutral maritime transport by 2050 feasible. The Netherlands therefore reserves EUR 111 million for the development of sustainable seagoing vessels in the 2025 Multiannual Programme of the Climate Fund. This reservation is used to scale up innovative sustainable propulsion techniques in maritime transport for hydrogen and methanol sailing. This is the early phase of scaling up, where there is still a significant unprofitable top. The 2025 multiannual programme details the design. The Climate Fund also provides funds for the introduction of hydrogen as a fuel in inland waterway transport. This amounts to EUR 30.5 million for 2025 and EUR 44.5 million conditional for 2026.

The Netherlands will also increase the availability of shore-side electricity for maritime and inland waterway transport to reduce, in addition to CO2, the NOx, SO xand particulate matter emissions from ships at the quayside. In addition to reduced deposition on Natura 2000 sites, this could contribute to the nitrogen space needed to significantly invest in land-based infrastructure for the production, supply and transport of sustainable fuels and energy carriers in the maritime ports in the coming years. Shipping can play an important role in this regard, both in terms of transport and the use of sustainable energy carriers. Ports play an important role in the production, supply and infrastructure of sustainable energy carriers.

Aeronautics

The Dutch policy for improving the sustainability of aviation is set out in the Aviation Note 2020-2050.
As described in Chapter 2, in addition to the essential goals and actions at global and European level, work is ongoing at national level to reduce CO2 on departing flights in sectors. Priority will be given to measures that have a direct impact on this, namely sustainable aviation fuels and innovative technologies.

The Netherlands has played a major role in the creation of the European blending obligation for sustainable aviation fuels: ReFuelEU Aviation, which is part of the 'Fit-for-55 package'. ReFuelEU will make a major contribution to theCO2reduction of aviation in Europe while preserving the European level playing field. There is a gap between the European obligation of 6 % incorporation and the national target of 14 % in 2030 (and further increasing towards 2050). The national target is not legally enforceable. The Netherlands therefore explores the possibility of achieving this objective with incentives.

In 2023, the Dutch aviation innovation strategy was presented with strategic choices at national level. This innovation strategy contributes to innovations leading to climate mitigation and, of course, to other innovation goals. Up to EUR 383 million from the National Growth Fund has been allocated to the Aviation in Transition project, which aims to help develop new ultra-efficient and hydrogen planes. In 2023, sub-projects focused on enabling hydrogen and hydrogen-electric demonstration flights, sub-projects aimed at developing lightweight materials and innovative cabling and systems were launched and related research has been launched. Aviation in Transition is part of the Recovery and Resilience Plan.

The Climate and Transition Fund promotes the development of new technologies. The 2024 MultiannualProgramme provided EUR 100 million for the development of gasification technology, including sustainable kerosene. The Multiannual Programme 2025 proposed a further allocation of 500 million for gasification technology. Proposals have also been submitted for the 2025 Multiannual Programme for Alcohol-to-Jet (90 million to be allocated), biopyrolysis (to be allocated 90 million) and e-fuels (60 million to be allocated, 150 million

100Parliamentary paper 32813, No 1349.

reservation). Alcohol to Jet and e-fuels are produced only for aviation, and biopyrolysis can be used more widely than for (aviation) fuels.

The government took a decision in principle in March 2023 to introduce a CO2cap per airport. This makes the CO2 reductiontargetsfor international aviation in the sector binding and secured through airports from the Netherlands. This is done to ensure certainty and clarity that the national targets will be met.

Finally, the Netherlands is at the forefront of formulating policies on the underhighlighted non-CO2 climateimpacts of aviation, for which an approach was published in March 2023. It focuses on more and better targeted research, global standards and European rules, and regional and public-private cooperation.

Agriculture and land use

Perspective

Improving the sustainability of agriculture and land use is crucial to achieve climate neutrality for the Netherlands by 2050. In this context, it is very important that the policy objective of climate neutrality for the Netherlands in 2050 is combined with the other challenges facing agriculture. A comprehensive transition is needed that significantly reduces the pressure on the living environment and provides a sustainable and attractive business model for the sector. Land use policy aims at creating carbon storage pools (in trees, forests, nature, peatlands). Here too, synergies with nature, water and similar objectives are the starting point of the approach.

Description of the policy

For the rural area, the integrated approach is set out in the National Programme for Rural Areas (NPLG). The approach in the NPLG focuses on livestock farming, arable farming and land use. Glasshouse horticulture policy follows a separate track. With the glasshouse horticulture sector, the government has signed a memorandum of understanding on further sustainability towards a climate-neutral greenhouse horticulture sector in 2040. The policy further focuses on achieving a sustainable food system as it has a positive impact on the climate. The Transition Fund for Rural Areas and the Climate Fund are important to support the agricultural transition. The Transition Fund will be used for the integrated approach in the rural area.101 The Climate Fund plays an important role in the energy transition in glasshouse horticulture. Importantly, investments made now take into account what is needed in the long term to achieve the goal of a climate-neutral Netherlands by 2050, so as to avoid lock-ins as much as possible.

Points for agriculture and land use are the continuation of the commitments of the Climate Agreement and the realisation of potential synergies between the different sectors in terms of the energy transition and the transition to a circular economy.

Coherent package of glasshouse horticulture

The coherent package to make greenhouse horticulture more sustainable will guide the sector and gardeners to achieve the sector's ambition to reach climate neutrality by 2040. The government supports this ambition with the use of tools that reduce the use of natural gas and incentivise alternatives such as electrification. The coherent package contains a variety of measures. An individual levy and fiscal measures are part of this package. In April 2023, the mission target was set at 4.3 megaton CO2eq.102 In this context, it is committed to reducing an additional 1,0 megatone compared to the commitments made in the 20 Coalition Agreement.

The CO2sector system for glasshouse horticulture is replaced by a flat individual CO2levy which will enter into force on 1 January 2025 and guarantee the target of 4.3 megaton CO2 eqrestemissie in 2030, as set out in the Law on fiscal measures for glasshouse horticulture. The government is committed to the balance between pricing and subsidisation and has made available funds from the Climate Fund with the Spring 2023 Notice, amounting to EUR 300 million for the Subsidy Warmte Infrastructure Glastuinbouw (SWiG) scheme and EUR 200 million additional subsidy for energy-saving measures through the EC scheme. The CO2levy is complementary to the fiscal measures announced in the 2021 Coalition Agreement, which were further elaborated in the course of 2023. The SDE + + category 'air-to-water heat pumps' has also been opened for glasshouse horticulture and funds have been earmarked for the temporary renewable heat projects subsidy scheme (HEHW), which was opened in 2023.

ETS2 opt-in

The government decided in April 2024 to apply ETS2 to the fossil fuels used in agriculture through the opt-in. These are fossil fuels used in agricultural machinery and stables. The Climate Fund reserves EUR 2 025 million for the period between 2030 and 77 to promote the sustainability of agricultural vehicles. The application of the opt-in for glasshouse horticulture has not yet been decided. Covenants and objectives already exist for glasshouse horticulture. The application of ETS2 to this sector will be further developed in order to maintain the balance of the package of the Tax Climate Measures Act on Glastuinbouw and the Agreement on Energy Transition Glastuinbouw 2022-

101The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).
102Parliamentary paper 32813, No 1230.

2030. The Government is striving for an opt-in to avoid significant problems of enforceability, fraud-proofing and enforceability of ETS2. The House of Representatives will be informed of the opt-in in horticulture by Prinsjesdag at the latest.

National Programme for Rural Areas (NPLG)

A significant part of the transition to sustainable agriculture and land use is channelled through the National Programme for Rural Areas (NPLG). This programme has an integrated approach so that multiple challenges (such as climate, nature, nitrogen and water quality) are addressed in a coherent manner. This programme makes an important contribution to the target of reducing methane emissions by 30 % by 2030 compared to 2020 (Global Methane Pledge) and to restoring the ecological balance with nature, soil and water.

The NPLG should deliver 5 megatons of CO2eq reduction in livestock and arable farming by 2030, with 3.82 megaton CO2eq consisting of methane to meet the target of reducing methane emissions by 30 % by 2030. It has been estimated that some 1 megatons of CO2eq can be achieved by purchasing arrangements used in103 the context of nitrogen. In spring 2023, it was agreed that the remaining 4 megatonnes would be normative and price-setting policy. Part of this will be filled in with measures to limit manure production (under the new derogation decision). A decision on remaining measures will have to be taken by a new government.
Options for this are set out in the Climate IBO, normalise the report and price nitrogen emissions from ABD-Topconsult and the draft Agriculture Agreement. The next government can therefore reach a weighted decision. The generic measures to be taken will in turn feed into the NPLG area programmes through which provinces provide area-focused and comprehensive implementation of the declarations. Synergies with target ranges for nitrogen and water quality are therefore taken into account in the choice of measures.

Subsidy scheme for high-quality manure processing

In 2022, the subsidy scheme for high-quality manure processing was introduced, with a first opening of EUR 6 million and a second opening of EUR 2 023 million in 7. A total of EUR 48 million over a period of 10 years is available for this subsidy scheme. The aim is to incentivise high-quality manure processing capacity of farmyard manure, and thus the production of high-quality fertilisers from livestock fertilisers (fertiliser substitutes), thereby reducing methane, lache and ammonia emissions. This is in line with the outline of future manure policy and the transition to circular agriculture.

Subsidiarity modules for improving the sustainability of housing and management measures

In order to stimulate house innovations that allow for full emission reduction (ammonia, methane, odour and particulate matter), the Subsidieregeling graniegeling ground-oriented sustainability of housing and management measures (SBV) is in place. Opening up as part of the peak load approach is currently under way. Before the scheme can be open, it is important to first get more certainty about the possibilities of permitting low-emission housing systems and techniques.104

Integrated approach to methane and ammonia emissions

The aim of the research and innovation programme “Introducal Addressing Methane and Ammoniak in livestock farming” is to provide insights into complex biological relationships and workable measures aimed at them. We now know that the impact and potential of management measures are high. Management therefore deserves a serious role in achieving the reductions. The programme develops practical measures for feed, grass management, animal, house and manure for dairy farming. Livestock farmers can use these measures to adapt their farms profitably and future-oriented to the challenges for climate and nitrogen.
This will require the measures to be economically justified and the emission reduction effect should be included in the emissions registration. It also looks at the reliable measurement and calculation of greenhouse gas emissions in livestock farming. For example, a measurement protocol for methane emission monitoring is being developed. In addition, recent studies by the WUR show that daily fertilisation significantly reduces methane emissions from manure from pigs.105 In addition, in combination with (mono) manure fermentation in dairy and pig farming, Dagontation can contribute to the production of green gas. Manure fermentation is stimulated by the SDE + + and in the future with the blending obligation.

National Closure Scheme for Livestock Farming (LBV) and National Termination Scheme for Peak Depriving Sites (Lbv-plus)

The LBV and Lbv-plus are schemes that allow farmers to receive subsidies if they voluntarily wish to end their production and production capacity definitively and irrevocably. The LBV is part of the structural approach to nitrogen, the Lbv-plus the peak load approach. Both schemes ensure a permanent contraction of livestock, which also structurally reduces emissions of nitrogen and greenhouse gases. Both schemes were opened on 3 July 2023. The LBV was closed on 1 December 2023. The Lbv-plus is open until 20 December 2024. There is a

103This is a very rough estimate based on the amount of funds allocated to nitrogen-focused purchasing schemes in the 2021 Coalition Agreement (EUR 6 billion). It is assumed that, due to the focus on nitrogen, the schemes mainly lead to a decrease in animal categories with low greenhouse gas emissions (such as poultry) and lower in animal categories with high greenhouse gas emissions (such as cattle).

104Parliamentary paper 30 252, No 149.

105WUR (2023) Report on emissions reduction of methane, ammonia, and odour in pig houses with daytime fertilisation, Wageningen, Wageningen University and Research.

strong interest in both schemes. Once farmers have ceased production, it becomes clear how much reduction is actually achieved in practice.

National Agricultural Soil Programme

The National Agricultural Soil Programme (NPL) aims to sustainably manage all agricultural soils by 2030 and to establish 0.5 megaton CO2 equivalents annually in mineral agricultural soils, in line with the commitments made in the Climate Agreement. The programme started in 2019 and has commitment from various chain parties. Between 2020 and 2030, EUR 28 million will be available for this purpose. To stimulate sustainable soil management and additional soil carbon sequestration, different traces are used. This includes, for example, stimulating the development and dissemination of knowledge, including through the Slim Land Use Research Programme and the transfer of knowledge to the forest through the Deltaplan Agrarisch Waterbeheer (DAW). In addition, the NPA aims to provide:

(financial) policy impulses for sustainable soil management through the Common Agricultural Policy/National Strategic Plan (CAP/NSP) and focuses on innovation and innovation in the chain.

Sustainable soil management requires tailor-made and area-based approaches, as measures may vary from one type of soil to another. As an area director, provinces have an important role to play in the implementation of the NPA by translating the carbon sequestration targets into measures appropriate to the regional characteristics of the soil. The draft NPLG includes a regional distribution for carbon sequestration by province. Finally, monitoring is also part of the NPL. Every 5 years, the Ministry of Agriculture, Nature and Food Quality (LNV) conducts research into the quality of agricultural soils with a large national sample: the 'State of Dutch agricultural soils'.

Veen-pasture approach

In the Climate Agreement, a declaration of 1 megaton CO2 eqof greenhouse gas emission reductions was agreed in 2030, to be achieved through concrete measures in an area of approximately 90.000 ha of peatlands as a sum of 6 regional peatland meadows. The mix of measures consists of: (a) converting approximately 10.000 ha from agricultural land to agricultural nature and wet crops; (b) Increase about 80.000 ha of groundwater levels, use of infiltration and innovative drainage techniques and soil measures. Provinces draw up the peat meadow strategies, with a total of EUR 2 030 million in deployment funds available at national level between 100 and 2020, following the previous EUR 100 million of impulse payments. This is partly paid through the CAP/NSP (EUR 50 million national), and possibly complemented by up to EUR 30 million in later years. In addition, EUR 20 million is available for research, measurement and monitoring through state procurement or grants.

In 2023, the peatland strategies became part of the NPLG provincial area programmes. The peatland approach is integrated: the challenges for climate, nitrogen, water, green blue approach, nature and biodiversity (including meadow birds) are addressed together.

In 2024, the subsidy scheme "Cooperation in peat meadows and transitional areas N2000" was opened. The aim of this scheme is to encourage the increase of groundwater level on grassland parcels in peatlands in order to reduce CO2emissions from peatlands. The combination of lower drainage (annual fee) and water infiltration (one-off fee) contributes to this reduction. The subsidy is covered by the CAP/NSP.

Trees, Forest and Nature Approach

With the implementation of the Forest Strategy, healthy, future-proof and socially valued forests are being developed. These forests contribute to the climate challenge, the enhancement of biodiversity, the opportunity for recreation and the circular economy through sustainable wood production. The Climate Agreement agreed to achieve additional carbon sequestration by 0,4 through the Forest Strategy and measures in other (wet) nature 2030-0.8 megaton CO2eq. The measures are divided into the implementation of the Forest Strategy and into wet nature measures. The Forest Strategy has ambitions for, inter alia, the creation of new forests within and outside the Dutch Nature Network, the restoration of forests and the creation of landscape features and agroforestry and aims to achieve at least 0.26 megaton carbon sequestration. For this purpose, 51 million have been made available from the Climate envelope and 210 million from the Nature Programme. The latter is specific to the compensation declaration. Currently, there is no programming with committed hectares per province until 2030 and the ambition for forest expansion outside the Dutch Nature Network has not yet been financially covered. Wet nature measures should deliver at least 0.14 megatons of carbon sequestration, but these are limited in the Climate Agreement. Therefore, a project team of wet nature has been launched whose task is to put in place realistic programming of measures for low bogs, raised bogs, transitional areas, sea/coast/salt marshes, open water and river marshes. The measures for new forest and forest restoration from the Forest Strategy, the objectives for agroforestry and landscape features and the challenge for wet nature are included as targets in the NPLG.

Food

The policy aims to reduce food waste, increase transparency on the sustainability of our food and shift from animal to plant-based proteins in the food pattern. Increased transparency is a prerequisite for targeted action. For example, a sustainability of supermarkets dashboard has been published to provide insight into the progress of the supermarkets in a number of key sustainable transitions. The average diet of the

Dutch population now consists of 43 % vegetable proteins and 57 % animal proteins (RIVM, Food Consumption Survey 2019-2021). The aim is to work towards a ratio of 50 % plant-based and

50 % animal proteins in 2030. This approach consists of a mix of incentives for adjustments or shifts in supply, information, monitoring and other measures. Advice was sought from the Health Council on the sustainability and health aspects of a further protein shift towards a ratio of 60 % plant-based and 40 % animal. This opinion was published at the end of 2023. In order to gain a better understanding of citizens' ideas about eating less meat and more plant-based products, a Citizens' Panel will take place in 2024.

Common Agricultural Policy/National Strategic Plan (CAP/NSP)

The Dutch CAP/NSP contributes to climate goals through the Green Blue Architecture. The intervention logic of this green-blue Architecture combines measures at company level (eco-schemes and conditions for income support, conditionality) with measures at area level (such as Agrarisch Nature and Landscape Management) and schemes for cooperation, knowledge acquisition, innovation and investment. This concerns, for example, measures targeting permanent grassland, landscape features, herbal grasslands andpeatland areas, as indicated above. The CAP does not provide sufficient resources to support the transition towards a sustainable and resilient agricultural sector. This is why the European CAP is complemented by national co-financing and other national instruments and funds as described above.

Built environment

Perspective

Millions of homes and buildings were preserved in 2030. A sustainably heated and well-insulated house or building is not only more comfortable, it is also good for both the climate and the wallet. We give priority to houses and buildings with the worst energy labels (E, F and G). Additional support and clarity on the final situation to be achieved are needed to make it possible for everyone to take part in the sustainability process. This will ensure climate gains and structurally lower energy bills.

Description of the policy

Due to strong environmental requirements for new construction and increasing the sustainability of the existing stock, greenhouse gas emissions in the built environment have decreased from 29.1 megatons in 1990 to 19.6 megatons in 2022 (see Table 4.7). This despite a sharp increase in the number of dwellings in recent decades. Despite the fact that much has already been started and continues in the PVGO, we are not yet there. The pace is still too low. In addition, climate targets have been further increased over time. The Government is therefore working with all parties to the Climate Agreement to further accelerate the sustainability of the built environment. At the heart of the approach in the built environment is to reduce energy demand through behaviour, insulation and hybrid heat pumps and to develop sustainable heat sources to meet this remaining demand. This is done through multiple tracks at the same time. Both through the area-based approach via municipalities (based on the transit exercises and district implementation plans) and policies for individual dwellings and buildings, making best use of transaction and replacement times. It is precisely when purchasing a house, moving home, refurbishing or replacing the heating system that makes it logical to take sustainability into account. Therefore, the intention is to tighten the requirements for the efficiency of heating installations from 2026 onwards. In doing so, the (hybrid) heat pump becomes the standard for heating homes, shops, schools and offices. This standard applies at the natural replacement times of the boiler and contributes to the upscaling of the (hybrid) heat pump in the built environment, and is therefore necessary for the natural gas release of the heating of the built environment.106

Special attention shall be paid to the affordability of energy bills. This is also due to the consequences of the war in Ukraine more timely than ever. Many households and businesses are facing an increase in energy bills. It is not good for part of households to pay. Investment earns back faster than ever. IPCC research has shown that the price of many sustainable measures has fallen over the last decade. The Netherlands therefore sees this as the moment to speed up energy saving and insulation. A better insulated house is the best insurance against rising energy prices now and in the future. It is important that everyone is able to participate and that everyone can access a lower energy bill. This will support vulnerable households in taking energy saving measures.

The acceleration of the energy transition, described by the PVGO, is accomplished by the Netherlands through a programmatic approach with clear targets, intermediate steps, measurements of progress, and agreements with, inter alia, corporations, municipalities and market players. This programme builds on previously established policies and ensures a cost-effective approach to buildings, with deep renovation of individual dwellings, a planned approach and demand aggregation of social housing, roadmaps and a portfolio approach for commercial

106 and social real estate. There is also a strong focus on making energy infrastructure more sustainable with local renewable energy, heat grids and green gas. Knowledge, innovation and the training of professionals will be given additional impetus and a special focus is placed on tackling energy poverty. Within the PVGO, there are five specific programme lines and two cross cutting programmes.

The five specific programme lines are:

The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).

1. The area-based approach to the heat transition (both the transition to the "way of natural gas" and the local isolation approach): addressing existing dwellings and buildings by street and district under the control of municipalities. Under a National Programme for Local Heating Transition, municipalities are provided with sufficient resources and support for their tasks. There will also be a new legal framework for powers for municipalities in the local heat transition.
2. The individual approach to owner-occupied and rented dwellings: individual owner-occupiers, both in the purchasing and rental sectors, are provided with easily accessible information, extensive delivery services, subsidies and funding. There will also be a clear policy of phasing out poorly insulated dwellings, also on the basis of European directives, and standardisation for the sustainability of dwellings.
3. The approach for non-residential buildings (business and social): for the professional building owners, an ambitious final standard for non-residential construction will be introduced. There will also be standards for phasing out poor energy labels in the utilities sector. In doing so, the owners of non-residential buildings are supported by grants, funding and practical support.
4. Sources and infrastructure (to develop sustainable sources and accelerate the roll-out of heat networks): natural gas is partially replaced by green gas, reducing CO2emissions and stimulating the development of sustainable sources and energy carriers. In addition, the tools and conditions for new infrastructure (heat networks) and appropriate sustainable heat sources will be implemented.
5. Innovation in construction: construction and conversion is becoming more innovative and more sustainable. Therefore, new market-ready products with higher (environmental) quality and lower costs for market segments with many similar dwellings will be introduced; after that, industrial and digitised construction and conversion must become the standard in all appropriate segments.

The two cross cutting programmes are:
1. the National Installation Programme which aims to isolate 2.5 million dwellings until 2030;
2. hybrid heat pumps programme to drastically reduce the use of fossil fuels for heating buildings.

Priority in the approach is energy savings

The priority is to save energy. Energy saved does not have to be generated, transported or paid for. The latter is now particularly important because of high gas prices. Awareness of energy consumption, behavioural change and implementation of simple saving measures are therefore an important part of the approach. This can already save a lot of natural gas in the short term. The broad coalition on energy savings and energy-saving measures will help to do so. Achieving the 2030 targets requires a combination of behavioural change, use of insulation and more efficient installations. This will lead to a structural reduction in energy use and greenhouse gas emissions, giving people a more comfortable home and lower energy bills. In order to meet the remaining energy demand, the Netherlands will provide renewable energy sources. The Netherlands is also developing techniques that reach a reduction effect only after 2030, so that the Netherlands is also ready for the next phase of the transition. The Netherlands wishes to reduce as much as possible the environmental pressures arising from the conservation activities themselves. Therefore, the Netherlands encourages the use of (natural) materials with low environmental pressure, the use of zero-emission feed and tools, the digitalisation of work processes and the industrialisation of sustainability concepts.

It is not easy to move from individual measures to a more collective approach, where 'street for street' and 'neighbourhood' are more sustainable. It requires the development of an enthusiastic offer, implementing power in municipalities and available knowledge and capacity from market players. Lessons learned in recent years, including from the Natural Gast-free Widening Programme (PAW), show how a collective approach is to be established and scaled up. This will be built on in the coming years in a national programme to support municipalities in the local heat transition.

The government translates the necessary greenhouse gas reductions into the following concrete sub-targets that the Netherlands intend to achieve by 2030:
- Isolate 2.5 million dwellings. The focus is on the 1.5 million poorly insulated dwellings (energy label E, F and G). More than EUR 4 billion is available for this purpose. Out of these 2.5 million:
  - 750.000 dwellings owned by vulnerable households isolated through a local approach together with municipalities.
  - 1 million rented dwellings insulated by landlords to the Standard for Housing insulation
  - 750.000 owner-occupied dwellings accelerated on their own initiative through, inter alia, the subsidies ISDE, SVVE and the Heat Fund.
  - additional energy savings are also made with low-threshold measures and the deployment of energy fixers. This helps alleviate energy poverty and make vulnerable households more resilient to high energy prices. • Phase out poor labels in non-residential buildings:
  - Making 15 % buildings with worst energy performance more sustainable by 2027, energy label G according to the new label classification to a minimum C energy label (60.000 buildings).
  - Make buildings with energy label F more sustainable in 2030 according to the new label classification to a minimum C energy label (60.000 buildings).
- Switching to sustainable installations or heat network:
  - 1 million installed hybrid heat pumps in the existing construction.
  - Creation of 500.000 new connections to a heat network in the existing construction (in equivalent dwellings).

• Increased deployment of sustainable sources: Blending of approximately 1,1 bcm green gas into the gas supply to ETS2 customers.

Depending on the progress of the various measures, the Netherlands is sending an update.

Vulnerable households will receive additional support through energy fixation teams to provide support across the country. The National Programme for Local Heating Transition provides support to municipalities in this regard. The government is also investing extra in making vulnerable neighbourhoods and villages facing a high share of energy poverty more sustainable. Through the Heat Fund, we are ensuring even less accessible funding for low and (low) middle-income earners. The 0 % interest rate is widened to cover incomes up to EUR 60,000. And for Associations of Eights-Owners (VEs), there will be a rebate on interest rates. For example, the number of households affected by energy poverty is decreasing and most vulnerable households observe that climate policy also works for them. In addition, additional funds are available in the Investment Subsidy Sustainable Energy and Energy Savings (ISDE) to support the investment in, inter alia, insulation and heat pumps. The Heat Infrastructure Subsidieregeling (WIS) scheme has been published to finance the unprofitable top of heat networks. The measure concerns a national subsidy scheme for heat networks in order to limit the unprofitable top. This will provide a total of EUR 600 million from the Climate Fund and a reservation of EUR 1 billion from 2025 onwards. There will also be a Development Fund for Heat Cooperatives. In addition, geothermal and scaling up green gas production continues.

With legal obligations, the government clarifies sustainable requirements for residential and commercial buildings, including social real estate, so that people know what to do. In doing so, the Cabinet uses as many reasonable deadlines as possible and close as possible to natural moments, such as a transaction or renovation. In doing so, we ask for more speed from professional building owners than from private residential owners.

The 15 % of buildings with use functions in shops, accommodation and assembly buildings with the worst energy performance should be preserved by 1/1/2027 and the next 10 % by 1/1/2030. This means on average the buildings labelled EFG per 2027 and label D per 2030. The use functions of health, education, sport and cell function will be subject to the years laid down in the final European Energy Performance of Buildings Directive IV. For cultural buildings, the possibility of applying the EPBD years will be considered.

The proposed programmatic approach would make it possible to better organise the sustainability of social property. Rented housing with an EGF label should also be accelerated in the coming years. These dwellings may not be rented out from 2029 if they are not at least ‘D’ label. From 2029, if sustainable, they will be directly preserved to the standard for home insulation so that they are ready to switch to sustainable heat in terms of insulation.

In order to ensure a sufficient pace in the sustainability of the purchasing sector in the future, residential owners are supported by the Heat Fund and by differentiation of lending standards on the basis of energy labels, thus giving EGF labelled housing more room for sustainability.
Citizens can rely on the availability of and subsidies. Finally, we improve the support of FTEs and the provision of information to citizens and local authorities, such as information for tenants via improvement house.

Climate action in care and sport sectors

The climate transition affects everyone: citizens, businesses and civil society organisations in all sectors. The care and sports sectors are therefore also contributing to their efforts to reduce their climate footprint. The Netherlands strongly supports this.

The urgency of making it more sustainable is felt in few sectors as in (public) care and well-being, as climate change and environmental impact harm public health. And the care sector also contributes to this. More and more parties and professionals want to break this paradox. In recent years, the Ministry of Health, Welfare and Sport (VWS) has facilitated the sector’s efforts to make care more sustainable.[107] With the third Green Deal *Working Together for Sustainable Care*[108], new agreements have been made with the sector. These include agreements on health promotion, awareness, CO2reduction, circular and economical use of resources and raw materials and environmental impact of medication (use). In Spring 2023, the government occasionally made EUR 42 million available to make care more sustainable and support for the Green Deal.
These funds will be used in the period 2023 to 2026 to accelerate the sustainable transition in (public) care and well-being, including through (implementation) research and scaling up of good practices. In the sport sector, the targets set out in the Roadmap for the sustainability of sport, consisting of the pillars CO2reduction, circularity and environmentally sound management have been pursued in recent years. This is supported by the Subsidy Scheme Incentive Building and Maintenance Sports Conferences[109] (BOSA), distribution of owners to promote sustainability through SportNLGroen and funding through, for example, the sports loan.

However, acceleration remains necessary. In addition to the generic climate toolkit, the Ministry of Health, Welfare and Sport (VWS) has

drawn up the Implementation Programme for Sustainability (Public Care and Welfare).107
In doing so, the VWS supports the sector in the transition to a climate-neutral system of (public) care and well-being with a view to its affordability, accessibility and quality. As part of this, the VWS explores what additional policy measures are needed to accelerate the transition to circular medical devices. To this end, the NEN explores a possible standard for the sustainability of medical devices. The Health Care Institute and the Dutch Health Care Authority are exploring whether and how sustainability could be an aspect of the basic guaranteed package and the funding of care, respectively.

With regard to sport, VWS is exploring with the Association of Sport and Municipalities (VSG) how a coordinating role for municipalities can contribute to speeding up the sustainability of the sport sector.108 The Ministry of Health and Sport also further engages in knowledge sharing and considers, on the basis of one or more pilot (s), what knowledge – in addition to the knowledge already available – is needed by municipalities and how it can best be disseminated. Finally, the VWS explores what is needed and possible to make financial instruments more responsive to the needs of the sport sector.

107 Parliamentary document 36200-XVI, No 122.
108 https://www.greendeals.nl/green-deals/green-deal-samen-werken-aan-duurzame-zorg.
109 https://www.dus-i.nl/subsidies/stimulering-bouw-en-onderhoud-sportaccommodaties.

Cross-sectoral energy system policies

The government has prepared the National Energy System Plan (NPE), which looks at the development of the energy system from a coherent perspective across all sectors and ongoing programmes and has a long-term focus, with the aim of reaching out to the energy system that the Netherlands plans to reach in 2050. In order to achieve the necessary energy infrastructure in a timely manner, the Multi-Year Energy Climate Infrastructure Programme (MIEK) has been set up. The PEH exists for the associated spatial planning and reservations.

National Energy System Plan

In order to achieve the desired acceleration in the transition of the energy system, the government decided to strengthen the control of the development of the energy system. The Netherlands does this because the speed with which we want to convert the energy system leads to many complex coordination questions. Public and private parties will need to take decisions to guide the energy transition from their own roles, while avoiding interdependencies and uncertainties about the development of the energy system as a whole. This implies the need for guidance from the Government to help resolve these coordination problems and to make balanced choices about the development direction of the system as a whole and in the long term.

With the development of the National Energy System Plan 2050 (NPE), guiding choices are made and developed for the development of the energy system. The first NPE has the following main choices: (1) maximising the development of renewable energy supply and energy infrastructure, (2) energy saving, (3) smart deployment of energy and infrastructure, (4) international connection and (5) steering together. It contains development paths for four energy chains: electricity, hydrogen, carbon and heat. The NPE will be a five-yearly tool presenting these choices in a coherent manner. The final NPE was published in December 2023 and the results have been taken into account in this plan. In addition to this five-yearly review, an Energy Paper setting out energy policy priorities and an energy system monitor reflecting the progress of the energy system will be published every year.

Energy Main Structure Programme

A CO2neutral energy system requires more space than a fossil energy system. The Government has therefore drawn up a programme under the Environment Act, aimed at planning and making spatial reservations for national energy infrastructure. This is the PEH. For this, possible energy system developments have been weighed up on the basis of, inter alia, system efficiency, feasibility, broad prosperity, land take and the impact on the environment. Using different scenarios for the development of the climate-neutral energy system for 2050, the PEH looks at the space needed to solve bottlenecks in the energy system. Synergies are also sought with other spatial developments, such as the sustainability of the economy, urbanisation or nature conservation. The PEH was established in close cooperation with co-authorities, network operators and other stakeholders.

On the basis of these analyses, the PEH made a number of policy choices towards 2050. The energy system of the future will become more energy and space efficient by reusing existing energy space and by smart clustering of new space seekers (such as electrolysis and batteries),

107Parliamentary Document 32813, No 1341 Annex to the Implementation Programme for Sustainability (Public) Care and Welfare 2024-2026.
108Parliamentary paper 30234, No 384.

especially in the large industrial clusters. This makes the energy system of the future more energy-efficient and space efficient. This also reduces the impact of the energy transition on the immediate living environment. By proactively freeing up space for future developments, future energy projects can be realised more quickly.

Due to the broad research scope and scope of the PEH, it is also a comprehensive energy plan for 2050, which provides a good basis for future developments of the energy system. The implementation programme of the PEH is now continuing to implement the different policy choices in the PEH.

Multiannual Infrastructure Energy and Climate Action (MIEK)

In order to achieve the climate targets (greenhouse gas reduction), sectors need to switch from fossil fuels to renewable energy. This requires timely programming, prioritisation and delivery of the necessary infrastructure. With the Multiannual Programme Infrastructure Energy Climate (MIEK), we are working with local and regional authorities and grid operators to plan energy and raw materials infrastructure projects forward, prioritise network operators and accelerate them. These projects are essential for the sustainability of industry and for the realisation of offshore wind energy.

In 2023, the MIEK was broadened to include the provincial multiannual energy and climate infrastructure programmes (PMIEKs). In the PMIECs, provinces indicate which energy infrastructure projects should be implemented as a priority in order to make the built environment, mobility, agriculture and industry (outside the 5 major clusters) more sustainable. In this context, it is important to work together towards a smart and effective interaction between provincial and national MIUK projects. For example, infrastructure initially built to make industry more sustainable can also contribute to the sustainability goals of the other sectors.

The Netherlands is committed to further strengthening energy infrastructure control by formalising cooperation processes and legally anchoring them where necessary. The Ministerial Order on “Priority Framework and MIEK” automatically includes109 network extensions for MIUK projects in the investment plans of the electricity grid operators. This gives MIUK partners assurance that the projects are actually implemented. In addition, the same scheme provides that network operators must carry out MIUK projects with relative priority. In order to further formalise the current trajectory up to a MIUK decision, the weighing framework will be further developed, the manual updated and a cooperation agreement with MIUK partners may be concluded.

Hydrogen

Hydrogen and hydrogen carriers from renewable and low-carbon sources are becoming an indispensable link in a climate-neutral society. In the long run, they replace an increasing share of the role that natural gas and oil now play in the energy and raw material system. Several sectors, such as industry and mobility, can and should switch to CO2free hydrogen (carriers). Plans from the 2022 Coalition Agreement, such as the conversion of gas power plants and the tailor-made arrangements with large industrial emitters, lead to an additional demand for the use of CO2free hydrogen. Specifically for the use of renewable hydrogen, the European Commission proposes binding targets in the industry and mobility sectors. In order to achieve sufficient supply in time, the Netherlands looks at both domestic production, coupled with offshore wind energy, and imports. Cost reduction through innovation and scaling up is important to make this offer affordable. This also applies to the facilitation of the national infrastructure. The Netherlands has earmarked up to EUR 750 million for the development of the transport network by Gasunie daughter HyNetwork Services (HNS). This is because of the risks associated with investment in energy infrastructure for markets that still need to evolve. Existing LNG import terminals – after conversion – may be used for large-scale imports of liquid hydrogen or hydrogen carriers such as ammonia or Liquid organic hydrogen carriers (LOHCs).

The Netherlands has a target of 4 gigawatts of domestic electrolysis capacity in 2030. Important for its feasibility is the timely preparation of a nationwide network of infrastructure and storage, timely connection to new wind to sea parks and sufficient support for the unprofitable top. The Climate Fund has been earmarked for this purpose. From the National Growth Fund, EUR 838 million is earmarked for the research, demonstration and investment programme GreeceNL. Parts of GreecelNL are part of the Recovery and Resilience Plan. In addition, the Netherlands is developing a mix of instruments for scaling up renewable hydrogen in the coming years.

The Netherlands opts for standardisation and subsidies in order to significantly scale up the hydrogen market until 2030. The annual obligation for RFNBOs in industry should provide potential exporters and producers with clarity on the demand for renewable hydrogen in the Netherlands. In addition, subsidies will serve to target the market and cover part of the additional costs.

For the upscaling of electrolysers for the production of renewable hydrogen onshore and offshore, around EUR 1.6 billion has been made available from the Climate Fund. It also includes reservations totalling more than EUR 5 billion for electrolysis. The funds are intended to stimulate the production of electrolysers with a capacity of up to 1 000 megawatts, both on land and at sea. The relevant financial instruments are being further developed. For H2Global, focusing on hydrogen imports, the Netherlands intends to launch, together with

109Amendment of the Order on investment plan and quality of electricity and gas, Government Gazette 2023, 11126.

Germany, an auction for a ten-year hydrogen (carriers) procurement contract for a total amount of EUR 600 million (EUR 300 million provided by both countries). The tender will be launched globally. The purchased hydrogen is then offered on the European market in the form of short-term forward sales contracts via the Netherlands and Germany.

Revision of the EU Gas Directive and Regulation

In December 2023, an agreement was reached between the Council and the European Parliament on the hydrogen and gas decarbonisation package. This revision of the EU Gas Directive and Regulation focuses (1) on hydrogen infrastructure and markets; (2) on hydrogen's access to existing (nature) gas infrastructure and markets for renewable and low-carbon gases and security of supply; (3) on network planning of hydrogen and natural gas and (4) on consumer protection. Among other things, the package facilitates the smooth development of the European hydrogen market by providing legal frameworks for infrastructure for (cross-border) transport, storage and import/export. Clarity on these rules is important for concrete investment decisions. After the entry into force of the package, Member States will have 2 years to implement the Directive in national legislation.

Other sectoral policies

As the climate transition affects all sectors in the Netherlands, the government is also looking for effective measures that have an impact in several sectors at the same time. These include the broad application of the new European trading system (ETS2), the phasing out of fiscal advantages for fossil fuels and raw materials, fiscal greening, tightening the energy savings obligation, extending the SDE + + budget (see next chapter on Renewable Energy), exploring the need to introduce a national emissions cap for ESR sectors, and the use of funds from the Climate Fund. In addition, the Netherlands is also pushing for a just transition across sectors, with a view to disadvantaged people and taking into account the social side of the transition such as the labour market.

Wider application of ETS2 and research on national emission ceilings for ESR sectors

By aligning as much as possible with European legislation, measures can be made enforceable. The Netherlands plans to implement widely the new European emissions trading system for the built environment, road transport and small industry (ETS2) in 2027. This is done by using the opt-in that the revised ETS Directive provides for. The government chose, in the 2024 Spring decision-making process, to bring the mobility sector fully within ETS2, in addition to road transport, including fuels used for rail, inland waterways and recreational navigation. For the agriculture sector, the government decided to apply it to the fossil fuels of subsectors of agriculture. These are fuels used in agricultural machinery and stables. Covenants and objectives already exist for glasshouse horticulture. In order to maintain the balance of the package of the Tax Climate Measures Act on Glastuinbouw and the Agreement on Energy Transition Glastuinbouw 2022-2030, the application of ETS2 to this sector is being further developed and the government will base its decision on this. The Government is striving for an opt-in to avoid significant problems of enforceability, fraud-proofing and enforceability of ETS2. ETS2 also applies to fuels used by Defence. The government chooses to apply it to all fuels, with the exception of fuels used for bi- or multilateral operations and cooperation and national operations. The government decides to exclude the fishing sector from ETS2. This is because a lack of perspective for action has been identified for the sector, there are European law restrictions on granting subsidies for sustainability in fisheries, and this sector is particularly vulnerable to an uneven playing field with competing fishing countries in the EU. Indeed, other large fishing countries are not expected to opt in. If the Netherlands were to opt unilaterally, this has implications for competition from Dutch fisheries.

Phasing out fiscal benefits for fossil fuels and raw materials

In recent times, there has been an increasing public debate about the benefits for users of fossil fuels and raw materials that do not allow sustainable alternatives to be sufficiently developed. There are no structural direct fuel price subsidies in the Netherlands. However, various expenditure schemes are (indirectly) linked to fossil energy consumption, fiscal fossil exemptions, rebates and adjusted tax rates. The Cabinet gave an overview of all these schemes in the 2024 Miljoenbrief. This overview will be updated annually.

The Netherlands has already phased out several of these schemes in recent years. For example, the refund scheme in the energy tax on electricity in favour of energy-intensive businesses was abolished with effect from 1 January 2023. In addition, energy tax benefits will be phased out in the next few years: energy taxation is becoming less degressive and a number of exceptions in the field of energy taxation are gradually adjusted. These include phasing out the reduced rate of energy tax on natural gas for the glasshouse horticulture sector and limiting the existing input exemption from the energy tax on natural gas for use in so-called combined heat and power plants (CHP). In addition, the tailor-made arrangements, the plastics blending obligation and the strengthened requirements of the European Renewable Energy Directive (REDIII) will further phase out fossil fuels and raw materials in the coming years. And the Dutch commitment to negotiations on the European Energy Taxation Directive (ETD) aims at accelerating fiscal greening across the EU.

The phasing out of fossil schemes should be carefully weighed and should not be an end in itself, but should be seen in a broader perspective of pricing externalities and climate policy goals. Any further phasing out of these schemes should therefore be carefully considered, taking into account, inter alia, (accumulation of) burdens and burden-sharing, carbon leakage effects and the impact on new

business.

Recently, the report on Building blocks for a better tax system, in which the various schemes set out in the Miljoenbrief have developed possible paths. A subsequent government will have to decide whether and which of these measures will be phased out.

Fiscal greening

The Netherlands' climate policy is based on a combination of subsidies, standardisation and pricing. This policy mix will make sustainable techniques more attractive (financially) and stimulate and help citizens, civil society organisations and businesses to choose the sustainable alternative.

The objective of the climate greening fiscal measures is to better price greenhouse gas emissions and energy consumption so that citizens, civil society organisations and businesses have a stronger price incentive to adapt their behaviour and reduce greenhouse gas emissions. Moreover, pricing greenhouse gas emissions contributes to making CO2-intensiveproducts relatively more expensive and CO2efficientproducts relatively cheaper. As a result, CO2efficient products will be purchased or used more frequently and demand will steer supply. Moreover, by increasing the price of greenhouse gas emissions, the market has an incentive to reduce emissions in an efficient way: the reduction in greenhouse gas emissions takes place there, where it can be cheapest.

Climate change is a global problem and our economy is internationally oriented. An international approach to greenhouse gas pricing is therefore the most effective. One example is the European Emissions Trading System, where a uniform European CO2price applies to major emitters.

In addition to the commitment to international greenhouse gas pricing, important steps have also been taken at national level in recent years, such as the introduction of a national CO2levy to ensure the achievement of the national CO2reduction target for the ETS part of industry. The 2023 Tax Plan tightened up the industrial CO2levy and introduced a CO2 minimumprice for industry. The tightening of the CO2levy ensures that the ETS part of the industry will reduce extra megatone in 2030 4 compared to what was previously agreed in the Climate Agreement. In addition, the 2023 Tax Plan adjusted the energy tax rates until 2030, as mentioned in the previous section on phasing out fossil subsidies. Tariffs on natural gas are gradually increased,110 while electricity prices are reduced. Finally, the 2023 Tax Plan provides that, as of 2025, the BPM exemption for merchant vans will be abolished and at the same time the base of BPM for vans will continue to be converted from list price to CO2emissions. As a result, the purchase of a new diesel delivery car will be more expensive, making it easier for companies to opt for an electric delivery vehicle. Finally, the 2024 Tax Plan package implemented a price package for the glasshouse horticulture sector, ensuring that emissions fall to 4.3 megatons in 2030. The package consists of phasing out the reduced energy tax rate for glasshouse horticulture (2025-2035), reducing the input exemption for the use of natural gas in electricity production (2025-2030) and introducing a new CO2levy on greenhouse horticulture from 2025.

With these national measures, the Netherlands has taken an additional step in greening the tax system over the past few years. Fiscal climate measures are the most effective in combination with the other climate and circular measures taken by the Netherlands, including through the allocation of funds from the Climate Fund, and will therefore be developed in conjunction with the broader policy package. See also the description of climate policy by sector. Some of the planned fiscal greening measures in the Spring Climate Package (2023) still need to be further elaborated. The decision on this matter is a matter for a subsequent cabinet. These include a further adjustment of energy tax rates and the introduction of Betalen to Use in car taxes. In addition, the Building Report for a better and simpler tax system includes additional recommendations for further fiscal greening.

Energy saving obligation

In 2023, the energy savings obligation was updated. This obligation obliges companies and institutions with an annual energy use of 50.000 kilowatt hours of electricity or 25.000 m^3 natural gas (equivalent) to take all energy-saving measures with a payback period of five years or less. The update covers the following issues:

- From July 2023, ETS companies, complex licensed companies and the greenhouse horticulture sector will be subject to the energy savings obligation.
- The obligation has been broadened to include measures to improve the sustainability of energy use. In addition to efficiency measures, measures to switch energy carriers and self-sustainable energy generation measures have become mandatory if they recoup in five years or less.
- The payback period methodology and the approved lists of measures have been updated with the latest insights on energy prices. As a result, more measures have become mandatory.
- Very large energy users – from 10 million kilowatt hours of electricity or 170.000 m^3 natural gas (equivalent) per year – are obliged to

110The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).

examine the measures to improve energy sustainability. This duty to investigate goes beyond the obligation to provide information, which applies to medium-sized enterprises. Both reporting obligations go beyond the EED audit, as companies and institutions have to draw up an implementation plan to effectively implement the measures.

Strengthening the energy saving obligation

Energy savings contribute to the climate challenge and lead to lower energy bills. The intention is to increase the payback period in the energy savings obligation to seven years in 2027. If all other factors remain the same, increasing the payback period from five to seven years means that more energy-saving measures become mandatory. The elaboration will identify the additional emission reduction and energy-saving effect associated with the accumulation of payback periods. The feasibility of the measures for businesses and institutions is taken into account in the further development. Funding will also be made available to support SMEs to implement energy-saving measures.

Deployment of negative emissions/carbon removals

The Netherlands can only achieve climate neutrality by focusing on negative emissions, or the sequestration of CO2 from the air, known as carbon removals. Carbon removals will play only a limited role in the period up to 2030; their deployment must not lead to a reduced commitment to reducing emissions. While carbon removal technologies and nature-based solutions still need to be further developed, there is potential in the short term to gain experience with carbon removals for subsequent scaling up. For example, by capturing and storing (partly) biogenic CO2emissions (CCS) at Avis and bioenergy plants and biofuel production. In doing so, the Netherlands is considering how to incentivise negative emissions that are technologically neutral and as efficient and just as possible and can be tackled as much as possible at European level. The deployment of biofeedstocks will always assess whether they are in line with the sustainability requirements of the sustainability framework for biofeedstocks, the availability of biofeedstocks, take into account the most high-value uses of biomass and the need for substitution of fossil carbon with non-fossil carbon.

For the longer term, the Netherlands is working on a Carbon Removal Roadmap, which will be developed in parallel to the upcoming Climate Plan for 2035. It further underpins and develops the overall policy vision and principles for carbon removals in the Climate Plan into a policy agenda and proposals for concrete instruments and other policies. For example, the Netherlands aims to ensure carbon removals that are consistent with the rest of climate policy, strengthen our earning capacity, ensure a level playing field within Europe, and prevent carbon removals from taking place at the expense of emission reductions.

Energy sector methane regulation

The energy sector methane regulation aims to reduce methane emissions in the fossil energy sector. The regulation lays down rules for measuring, reporting, verifying and reducing methane emissions in the energy sector. Member States should designate competent authorities responsible for ensuring that operators will comply with the obligations imposed. The trilogue phase of the negotiations was concluded at the end of 2023. The Regulation was adopted at the end of May 2024. After signature by the Presidents of the Council and the EP, the regulation will be published in the Official Journal and will follow the entry into force of the Regulation 20 days after its publication. This will be around the end of June 2024. As a result of the approach in force in the Netherlands for more than 18 years, methane emissions in the Dutch energy sector have not been high. Unnecessary emission sources have been removed from the processes for some time and permit requirements also require all operators to monitor emissions periodically, thus detecting leakages relatively quickly. If they find leaks, operators should repair them. This is monitored by the State of Mines, and the implementation of the Regulation will give rise to an additional task for network operators in the maintenance of the network. Where, until now, the network needs to be maintained from a safety point of view, with the entry into force of the Regulation, the environment will also be involved in the maintenance of the gas network.

F-gases

On 11 March 2024, the revised European F-gas regulation entered into force. According to the Impact Assesment, this will lead to some 16 % additional emission reductions in Europe by 2030. There are no indications that this will differ significantly for the Netherlands. However, the Netherlands is considering additional deployment compared to the minimum requirements of the Regulation, such as broader certification requirements, creation of a central database and differentiation by type of refrigerant in existing subsidy instruments for heat pumps.

Specific measures to promote high quality uptake of sustainable biofeedstocks

As indicated, the Netherlands is convinced that sustainable bioraw materials have an important role to play in the transition to a climate-neutral and circular economy by 2050. In doing so, the Netherlands is guided by the principle that only sustainable bioraw materials can contribute to this transition and that sustainable bioraw materials should ultimately be used as high quality as possible.

Sustainable biofeedstocks are mentioned when they are produced sustainably.111 That is to say without adverse effects on humans and the

111SER (2020) Biomass in balance sheet.

environment. By ensuring sustainability criteria for bio-raw materials in regulations, environmental risks of unsustainable raw material production and processing are minimised – such as soil depletion, groundwater and surface water pollution, biodiversity degradation and air pollution. To this end, work is ongoing to establish the environmental criteria and to ensure them in regulations on sustainability of bio-raw materials, specifically in a decision and regulation.

The starting point for setting the environmental criteria in legislation is to follow as much as possible the European system of ensuring sustainability of bio-raw materials, as laid down in the European Renewable Energy Directive (REDII and revision REDIII). This concerns both the substantive sustainability requirements and112 the system to ensure that companies can demonstrate that bio-raw materials meet the sustainability criteria through the use of certification. Indeed, REDIII also lays down requirements for the management of certification schemes (management requirements) and the assurance of sustainability requirements by the*chain of custody*. The choice to follow REDIII as much as possible makes the Netherlands because it is a very thorough and robust system for sustainability assurance and supervision, while strengthening the necessary cooperation between all European Member States. This makes it an effective system both to impose sustainability requirements and to effectively monitor them. However, for biofeedstock uses other than for energy, there may already be different ways of working in practice. As a result, it is not simply possible to take over the entire RED system. In that case, a system is chosen that is appropriate to the practice, without compromising the sustainability of bio-raw materials. In addition, European regulations or directives (such as the Construction Products Regulation, which is currently under revision) may not allow for additional national requirements. This will of course be taken into account in further implementation.

The sustainability criteria focus on the application of all types of bio-based raw materials, including materials for the circular economy (such as materials for construction and raw materials for the chemical industry) and the use for energy generation. These are bioraw material flows and applications promoted or regulated by the government. For the time being, the sustainability criteria do not apply to the use of bio-raw materials for fibres (paper and textiles) and to feed and food production, including transport.113 In the Netherlands, the ecological criteria for solid biofeedstocks for energy applications are currently implemented in the 'Decree on conformity assessment of solid biofeedstocks for energy applications' (hereinafter: decision on conformity assessment) and the underlying scheme. The Dutch requirements set out therein continue to apply to existing subsidy decisions – the new Decree introduces a transitional regime. New decisions for energy applications will become the new act when it enters into force. By aligning as much as possible with the European sustainability assurance system, a level playing field and harmonisation below the European standard will be possible and supervision is solid.

As regards the cascade principle, the Dutch sustainability framework includes an overarching commitment to the use of biofeedstocks for different high and low grade applications. This concerns biofeedstock applications as an energy source and as a feedstock. As a result, sustainable bioraw materials are only used when applied in the final picture or in the transition towards it. Where sustainable alternatives become available in the short term, this will in the long term lead to a phasing-out of the subsidy on the use of biofeedstocks for those applications.

Currently, for example, this is already happening with the use of biofeedstocks for energy. Currently, no new subsidies are provided for woody biomass projects with electricity only, low temperature heat and high temperature heat in the built environment and greenhouse horticulture. In addition, the Netherlands has announced that it will standardise and incentivise high-value applications of bio-raw materials. For example, standardisation for blending 25-30 % recycling or bioplastic will be established and biobased construction will be encouraged.

With the combination of phasing out low-grade applications, strict sustainability requirements and incentivising the uptake of bioraw materials for high-value applications, the Netherlands ensures that sustainable bioraw materials are used as high quality as possible and we are working towards a climate-neutral and circular economy by 2050.

Spatial frameworks: National Environmental Vision, Novex and Mooi Nederland

The National Environmental Vision (NOVI) is the guiding framework for the development of the living environment in the Netherlands. In view of various spatial challenges such as climate change, housing and mobility, the NOVI provides an integrated vision of the future design of our country and guides decentralised choices. The different challenges have been further developed in a number of thematic programmes, including the PEH. In doing so, the NOVI implements the objective of strengthening environmental quality in the Netherlands.

The Novex programme explores the national and regional spatial challenges for each province, and all the authorities work together on a

112Although the Dutch environmental criteria go beyond RED in some respects, for example by imposing additional requirements for the responsible management of waste and water availability (this is already the case in the current Decree on Conformity Assessment of Solid Biomass for Energy Applications).

113Fibres (paper and textiles) and feed and food production are currently not included in the scope of the sustainability framework, as these uses are not included in the SER opinion "Biomass in Balans". Transport is not included because REDIII requires you not to impose any additional requirements for bioliquids at national level.

plan for the spatial development of the Netherlands. Areas where many challenges come together have been identified as focus areas; the so-called NOVEX areas. As a sustainable energy system requires more space, it is important for the energy transition to have enough space for energy infrastructure in these areas. The PEH has identified and implements the space demand of national energy infrastructure.

The Mooi Nederland programme aims to put spatial quality at the heart of the spatial development of the various challenges. The results of the Novex and Mooi Nederland programmes lead to new national spatial policies: the strengthened NOVI (Space Note), the preliminary draft of which is expected in 2024. The PEH serves as an energy input for this purpose.

The Omgevingswet entered into force on 1 January 2024. With the introduction of the Omgevingswet, several laws relating to the physical living environment are brought together into a single coherent legal system. The law thus provides the basis for a more coherent approach to the living environment, with space for local customisation and faster decision-making. A number of instruments related to energy infrastructure are changing their form. For example, on the basis of the (previous) Spatial Planning Act under the Omgevingswet, the Rijksinpassplan with the national coordination scheme becomes a project decision with coordination rules. The Environment Act aims to make it easier for citizens, businesses and institutions to find relevant rules. Under the Omgevingswet (Omgevingswet), citizens can turn to a one-stop shop of the public authorities. It also extends the opportunities for participation of citizens, businesses and civil society organisations.

Just transition: current policies

The climate transition requires many of people, businesses, civil society organisations and public authorities in the Netherlands. If the distribution of these climate costs is not perceived as just, the acceptance of climate policy is under pressure. The Scientific Council for Government Policy therefore recommended that climate policy be treated as a distributional issue. The Netherlands embraces the recommendations and considers a just transition to climate neutrality important. Therefore, with the measures adopted in spring 2023, the Netherlands took greater account of the distributional effects of the policy and thus put more emphasis than before on disaffection of vulnerable people and greater responsibility of the stronger shoulders. In particular, in the built environment, care and support for vulnerable households is important in terms of (risks of) energy poverty (energy poverty is further addressed in point 3.4.IV Energy poverty). For example, a greater focus on entertainment has been translated into the goal of isolating corporate housing in 2030 675.000, and of releasing 450.000 existing corporate housing from natural gas. For this purpose, agreements have been made with landlords to accelerate the sustainability of all social rental housing with the lowest labels (E, F and G) until 2028. Landlords of private rented dwellings will have to comply with this requirement in 2030. In order to allow tenants to benefit from this sustainability, it has been agreed that they will not receive any rent increase following insulation measures leading to a better energy label. This has helped lower incomes in particular because they are relatively more likely to live in rented dwellings.114

In addition, the 2023 Spring Package includes measures to strengthen vulnerable neighbourhoods, facilitate the construction of solar panels in the rental sector so that tenants also benefit from sustainable energy generation, raise the heat fund, make funds available for DIY vouchers and provide VVEs with sustainability.
This government is also taking additional measures to support households with limited opportunities to make them more sustainable, for example through area-based approaches in the built environment and the deployment of energy ecoaches and fixers.115 The latter already has positive effects in the short term.116 117In total, this equity package within the built environment represents an additional EUR 900 million of funding for low- and middle-income earners. In addition, the Temporary Emergency Fund for Energy was set up in 2023 for the group of households that were not sufficiently helped to pay their energy bills in the short term. This will help vulnerable households pay their energy bills. In 2023, 50.000 households with high energy equals received support from the Temporary Emergency Fund for Energy. The fund was reopened temporarily in January 2024 and is provided with a subsidy from the central government and money from energy suppliers. Fairness is also addressed in the NPE) which sets out the vision for the energy system towards 2050. In the NPE, fairness as one of the eight public interests is taken into account when making choices.

Many citizens, businesses and social institutions are already contributing to the energy transition. For some, the prospect of action is still missing, which is crucial for contributing. For this perspective, it is important to have the right information at its disposal, as well as the easily accessible opportunities to play an active role in the energy transition, and the ability to work with the information and opportunities. Citizens, institutions and businesses need understandable information about the energy transition and what they can do. Research shows that most people prefer to receive information on what they can do via television and (public) websites.[120] The Netherlands is therefore committed to providing this information through various campaigns and websites. For example, on the public website VerImproving huis.nl,

114TNO (2023) Energy costs of different types of households in the Netherlands. A distinction according to income, ownership and housing quality, The Hague, TNO Public.
115Energy ecoaches and fixers implement small to medium-sized energy saving measures among residents living in energy poverty.
116TNO (2023) National Research Programme on Energy Poverty. Effects of fixers/energy ecoaches, renovations and white benefit schemes, The Hague, TNO Public.

residents and building owners can find tips, including on small, practical possibilities to make their homes more sustainable. Digital accessibility has been taken into account in the development of Verimprojehuis.nl. This means that the site is as useful as possible for everyone, including people with disabilities.

Distributional effects have also been addressed in the other sectors during the last package of measures. For example, measures have been put in place to support smaller companies – for which the transition is more difficult – with an SME relief programme and grants (EUR 50 million for an SME relief programme and EUR 150 million to support SMEs in the increased energy savings obligation). Within mobility, a purchase subsidy for private second-hand EV has been decided to make electric driving more accessible to people with less power (EUR 528 million).

Due to differences in carrying capacity, the Netherlands also expects faster steps by businesses than individual citizens in the mobility sector. For example, by strengthening the CO2target for work-related passenger mobility. This puts more responsibility on employers to look for emission reductions from business and commuting. It also includes performance agreements for heavy and freight transport, the introduction of a CO2 base for lorries in the truck tax and the obligation to use energy label B on average in inland waterway transport in 2030.

Social climate fund

The Netherlands is preparing the implementation of the Social Climate Fund (SCF) with a focus on contributing to a just design of the transition towards climate neutrality, with a particular focus on the sectors covered by ETS2. The fund was established for the period 2026-2032. During the negotiations, the Netherlands indicated that the SCF should contribute to the transition towards climate neutrality, with a focus on financing measures that mitigate the impact of price increases for less wealthy groups and structurally contribute to making the built environment and mobility more sustainable. The Netherlands is exploring how the objectives, and possible targets and contributions from the Social Climate Fund, can best be aligned with Dutch climate and energy policy, including tackling energy poverty. Member States can claim the SCF funds by submitting national Social Climate Plans (SCPs) by 30 June 2025, including a public consultation of stakeholders. The plan should consist of investments aimed at reducing reliance on fossil fuels, as well as any measures aimed at mitigating negative impacts in the short term through, for example, income support.

The potential effects of ETS2 have been considered in order to make good use of the resources. This shows that the introduction of ETS2 to a household with average gas consumption in 2027 is expected to cost an additional EUR 140 per year, and additional costs are expected to increase as the number of available ETS2 allowances decreases. In 2020, more than 400.000 households in poorly insulated dwellings (energy label D, E, F or G) had high energy quotas. Without the financial measures taken by the central government to compensate people for high energy prices in 2022, this group would have doubled compared to 2020 to around 1 million households due to the current higher energy prices. The potential increase in the number of households in energy poverty at higher energy prices is highest among owner-occupiers in both relative and absolute terms,[121],118 119 120 and energy poverty is now more likely to be a problem for owner-occupiers than tenants due to higher energy prices. In addition, research institute shows

[120] TNO (2022) Citizens on climate policy: investigation of concerns and solutions, The Hague, TNO.
[121] Differences in vulnerability to high energy prices require targeted policies (tno.nl).

TNO notes that energy poverty is also highly income-dependent and almost exclusively among households in poorly insulated housing with an income of up to EUR 60,000.[123] owner-occupiers and private sector tenants with low (middle) incomes living in poorly insulated dwellings have the highest energy equals and are most vulnerable to higher energy prices.

Tenants will be better protected from high energy bills in the longer term by preventing landlords from 1-1-2029 from renting out dwellings with an E, F or G. Energy Label E, F or G. Supplementary Agreements with housing corporations (National Performance Agreements) that in 2030 450.000 dwellings there are natural gas free and 675.000 homes are isolated for future purposes and that insulation costs are not passed on to higher rents. In addition, rents in the regulated sector are more determined by the energy efficiency of the dwelling by adapting the housing valuation system. Although different subsidies and easily accessible funding options are available, lower-income owner-occupiers in poorly insulated dwellings still make little use of them. This may be due to the fact that the total investment is too high, due to insufficient bridge financing or insufficient ability to teach or trust. It is therefore expected that this group, owner-occupiers with an income up to 60.000, will be able to cope with the effects of ETS2 in the built environment or have the possibility to invest in sustainability in order

Of118 course, the necessary costs of the existence go beyond energy costs, and tenants' dwelling is about the
in general, it is also higher. Therefore, attention should continue to be paid to this group, which is also rapidly facing problems with increased energy prices.
can come.

to avoid these costs.

Transport users will also face rising prices for fossil energy in the coming period. The extension of the European emissions trading system to road transport and built environment (ETS2) as of 2027 gives a levy onCO_2emissions from motor fuels for mobility. If the price of EUR 50 per tonne of CO_2 expected by the European Commission in 2030 is correct, the PBL estimates that this would be between 11 and 12 cents per litre when fuel suppliers fully pass it on to pump prices.[124] ETS2 is explicitly not the only policy contributing to an increase in pump prices. The implementation of the REDIII and blending policy proposals can also lead to price increases for fossil fuels.[125] Both blending and the emissions trading system are effective means of additional emission reductions and make zero emissions transport alternatives relatively more attractive. However, vulnerable transport users with (the risk of) transport poverty that cannot be affected by the transition to zero emission means are also affected by these higher fuel prices. In addition, a possible suspension of the current excise duty rebate and the delayed indexation of excise duties will also lead to a higher price of fuel prices for the same transport users. Within road transport, it is first expected that these price increases are most likely to come to low-income citizens who need to have and use a car because they have no alternatives. This group is also referred to as 'forced car owners'. This group is estimated at 5.5 % of all car owners.121 Forced car use often refers to situations in rural or suburban areas with little public transport, where it is necessary to travel to night work (care, distribution centres, etc.), work in car dependent locations, informal care tasks, and/or solo operators (microenterprises).

In 2024 and 2025, this analysis will be further elaborated and used to guide the Social Climate Plan to mitigate the social impact of ETS2 on the most vulnerable households.

The Just Transition Fund

One of the key European funds contributing to achieving a just transition in the Netherlands and within Europe is the Just Transition Fund (JTF). The main objective of the JTF is to enable regions that rely heavily on fossil fuel revenues and employment in a just equivalent way to engage in an energy transition. A transition that takes into account social and economic aspects and environmental impacts. The total JTF budget for the Netherlands is around EUR 630 million. The programme runs from 2021 to 2027.

[123] TNO (2023) Energy costs of different types of households in the Netherlands. A distinction according to income, ownership and housing quality, The Hague, TNO Public, and TNO (2023) National Energy Poverty Research Programme. Effects of fixers/energy ecoaches, renovations and white goods schemes, The Hague, TNO Publiek.The support measures provide on average savings for households of around EUR 1,000 per year for renovation, around EUR 275-550 on an annual basis for energy fixer/energy ecoach.

[124] PBL (2023). Climate and Energy Outlook 2023. The Hague; PBL Planbureau voor de Leefomgeving, p. 62.

[125] Keuzewijwijzer Klimaat en Energie | Report | Rijksoverheid.nl, p. 61.

The Transition Fund shall support territories most affected by the transition to climate neutrality and avoid widening regional disparities within the European Union. Making Europe fully climate-neutral by 2050 will require a transition of the emission-intensive industries, accompanied by major socio-economic challenges. The Transition Fund provides financial support to vulnerable areas for this purpose.

The JTF financial envelope dedicated to the Netherlands goes to six regional territories most negatively affected by the impact of the climate transition and thus facing major transition challenges. These include regions with large emission-intensive industries. The regions concerned are: Groningen-Emmen, IJmond, Greater Rijnmond, West Noord-Brabant, Zeeuws-Vlaanderen and South Limburg. The projects focus on three tracks:

- Track 1: **Innovation**. Funding for the innovation trail is channelled towards projects leading to economic diversification, modernisation and conversion.
- Track 2: **Investments in technology, systems and infrastructure**. The funds earmarked for this track will go to projects that develop the 'hardware' needed for the transition.
- Track 3: **Labour market**. Half of the available funds are earmarked for labour-market related projects. These include job creation, upskilling and reskilling of workers and jobseekers, job-search assistance for jobseekers and active integration of jobseekers. There is an extra focus on young people.

The funds from the Just Transition Fund are distributed between tracks in the Netherlands as follows: rail EUR 1 million, Rail EUR 2 million, Rail EUR 206 million, and for rail EUR 3 million.

Quality employment and training opportunities

121Kim (February 2022), The Social Impact of widespread car ownership in the Netherlands, p. 94.

The transition to a climate-neutral society is also transforming the labour market. Some jobs will disappear, for example in the coal sector, but we are already seeing that the number of new jobs needed for the transition is growing more rapidly in the short term. The number of vacancies per 1000 jobs (the vacancy rate) more than doubled in technology between 2011 and 2021, from 20 to 50 respectively. In the energy supply, the tight vacancy rate of 55 is higher than average.[127] In December 2023, almost 90.000 vacancies were open to technical occupations.[128] TNO estimated that 39.000 to 72.000 jobs will be created by climate action taken by the Netherlands until 2030, compared with 6.000 to 11.000 jobs lost due to the transition as in the oil and coal sector.[129] We have its own dashboard with data on the amount of unfilled vacancies and training to monitor where possible bottlenecks in the transition.[130] This shows, for example, that in every region in the Netherlands, the voltage indicator is "very tight" for energy transition occupations, except in Groningen and Drenthe, where this is "tight". It also shows that, in 2023, a large number of vacancies are particularly open to fitters of industrial machinery and equipment, which are particularly needed to make industry and agriculture more sustainable.

To avoid a shortage of professionals leading to delays in the implementation of the transition, the Green and Digital Jobs Action Plan was published in early 2023. With this, the Netherlands is taking several steps to ensure quality employment and training for the transition. Tackling labour market tightness in technology and ICT is a common challenge for employers, workers, education and public authorities. This requires action on different fronts. The Netherlands focuses on four pillars:

1 . Increase input into bettatechnical education; Demand for technicians and ICT professionals has been increasing for years, but the inflow into education is not large enough to meet labour market demand. In view of societal challenges such as the climate and digital transitions, it is important to enthusify more young people for training and employment in technology and ICT.
2 . Maintaining and increasing inflows into the bettatechic labour market; Given the great leak of technicians from technology and ICT, it is important to focus on their preservation. In addition to policies aimed at stimulating side inflows from other sectors,122 matching supply and demand, and developing lifelong learning (LLO), it is important to look more broadly at the influx of specific target groups.

127 ROA and SEO (2022) labour-market technicians. Developments, statements and prospects for action.
128 Dashboard Online job vacancies UWV (werk.nl).
129 TNO (2019) Exploration of employment effects of climate action.
130 Mosaic – Labour market and training (dashboard climate policy. nl).

3. Labour productivity growth; The solution to shortages can be found not only in helping more people to find a job, but also by focusing on labour productivity growth through (process) innovations and digitalisation.
4. Strengthen governance and reduce fragmentation; Given the social, economic and social consequences, the government sees a clear role for the government to address labour market tightness. This means that the government intends to work more actively and with a greater focus than before on removing obstacles and removing bottlenecks that prevent the matching of supply and demand.

The year 2024 will implement a governance structure on the Green and Digital Jobs Action Plan.
In doing so, we build on the strength and cooperation between existing structures. The commitment has been made to:

- One clear implementation structure for education, business and regional authorities.
- Improve the effectiveness of governance through short and powerful lines.
- A recognisable regional objective in terms of labour market shortages.

A first progress report will be delivered in autumn 2024. We want to monitor the implementation of the measures set out in the Action Plan to ensure their effectiveness. With a new set of indicators and basic data, we aim to monitor as effectively as possible the autonomous development and impact of policies, although this will always be subject to the necessary uncertainty.

In addition, employers in the engineering sectors also contribute to this by means of a Techniek valley plan.123 With the Chronisch Tortfall Plan, some five ICT industry associations and their employers are focusing on increasing the influx of ICT into the labour market: 1. Promotion of choice for ICT and technical professions 2. Training from PO to vocational education and 3. Necessary cultural change 4. Side inflows from other sectors and countries 5. Accelerating a regional approach.124 Technology and ICT offer opportunities for all. This is why the four pillars of the Green and Digital Jobs Action Plan and the Employers' Action Plan also address underrepresented groups, such as women and young people with a migrant background. A first activity stemming from the attack plan is the Techniek Inclusive pilot to ensure that both women and other less represented target groups feel welcome, at home and safe in the technical labour market. The government also intends to promote the entry of people away from the labour market into the technology to match employers' intention to attract new target groups. For example, the cabinet jointly launched a coalition for more diversity (VHTO) (the Centre of Excellence on Gender Diversity in beta, Engineering and IT) and the Talent and Techniek Platform. The aim of this coalition is to develop a nationwide, integrated approach to increasing the share of women in technology, for example by improving more attractive working conditions and the

122Subsidy scheme for retraining in high-potential ICT and Techniek professions, see Parliamentary Document 32637, No 469.
123 Plan for labour market shortages Techniek, Construction and Energy, see MKB NL Aanvalsplan arbeidsstekortenI def.indd (vno-ncw.nl).
124 Aanvalsplan-Chronisch-Tekort-ICTers.pdf (nldigital.nl).

perception and image of technology.

A good example is the one-off investment of EUR 123 million in strengthening 15 public-private partnerships(PPSs) in vocational education. This money will scale up best practices such as short-term retraining programmes such as RDM campus (energy/green transition in the maritime sector) and Make IT Work (digital transition) to improve the connection of education to the technical labour market.

Procedural justice

Climate justice also means that fair procedures are in place. This is why a government vision on engaging citizens in the energy and climate transition is presented this year. This vision describes how residents of the Netherlands can (better) be involved in policy making at national and local level. Preparations are also being made for a possible National Citizens' Forum on climate and energy policies. See also point 1.3.III. "Involvement of stakeholders, civil society and the public" of this chapter. In addition, the National Climate Platform was set up at the end of 2022 to link practical experiences of citizens, businesses and civil society institutions with policies. The NFP informs the public authorities about what lives in society and advises on how to achieve a more connected and just transition.

For general poverty policies and debt approaches, please refer to the text on energy poverty in point 3.4.IV Energy poverty.

II Regional cooperation

As described in Chapter 1.4.I, on the basis of the previous work on the Vision 2050, the Penta-countries continue to work towards a common political vision for a decarbonised electricity system, which should be achieved as soon as possible and ideally by 2035. This was also pronounced by ministers in December 2023. NSEC is also contributing to decarbonisation given its focus on wind energy.

III Applicability of State aid rules, financing measures in this area at national level, including Union support and the use of Union funds

Climate policy has several financial instruments to achieve desired incentives to achieve the transition. This chapter discusses the main cross-sectoral financial instruments. First on the design and development of the Climate Fund and finally on the tax instruments.

Climate Fund

The Climate Fund is one of the main instruments to enable funding for measures contributing to the target of at least 55 % reduction of CO2by 2030.

Objective and scope

The objective of the Climate Fund shall be to facilitate measures that contribute to reducing greenhouse gas emissions to the levels referred to in Article 2 of the Climate Law, and contribute to the transition to a climate-neutral energy supply, economy and society and to contribute to a just climate transition by making financial resources available for:

a. A greenhouse gas neutral energy supply by 2050. This means a CO2 neutralelectricity production that does not release greenhouse gases into the atmosphere or uses biomass as a fuel, building the necessary energy infrastructure and providing the necessary renewable energy carriers. Under this spending objective, this primarily refers to the following:
   a contribution to the construction of two nuclear power plants, a subsidy scheme for CO2 free gas plants. To enable gas-fired power plants to use greenhouse gas free gas for the creation of a zero-greenhouse gas controllable power. In addition, there is a contribution to energy infrastructure. These are subsidies for the realisation of infrastructure necessary for the energy transition, such as hydrogen and heat infrastructure and charging infrastructure. No ex ante selection is made for certain technologies or sectors. Finally, this spending target includes a contribution for early scaling up. Early upscaling is a programmatic approach to technologies for – initially – high-performance renewable energy carriers that can only facilitate cost-effective greenhouse gas reduction in case of substantial scale-up.
b. Promoting energy efficiency, the deployment of renewable energy and other greenhouse gas reducing and circular techniques and measures in industry. This means primarily binding tailor-made arrangements with industry. This includes resources for greenhouse gas saving innovation in small and medium-sized enterprises. These resources from the Fund shall cover both the reduction of energy emissions and non-energy emissions. This should be a truly additional reduction compared to existing policies. This is a combination of energy infrastructure and early scaling up. The purpose of this spending is therefore also to be understood as: an early upscaling of other greenhouse gas abatement techniques and measures that can only facilitate cost-effective greenhouse gas reduction in case of substantial scale-up.
c. Boosting energy efficiency, renewable energy and carbon sequestration in the built environment (such as biobased construction). This refers to measures that reduce energy demand in the built environment and stimulate the use of renewable energy in the built environment. In the first instance, this refers to: The National Installation Programme, the sustainability of social property and the stimulation of hybrid heat pumps.

Decision-making

There is one decision-making moment per year in line with the existing budget cycle. Departments wishing to use the fund may submit a substantiated proposal to the fund manager, the Minister for Climate and Energy. The assessment by the fund manager will be reflected in

the draft multiannual climate fund programme. The Environmental Planning Agency and socio-economic experts provide independent reflections on the draft assessment of the fund manager and all measures submitted. These opinions will feed into the preparation of the draft multiannual programme.

Multiannual Climate Fund 2024

As part of the April 2023 Supplementary Policy Package, the Multiannual Climate Fund 2024 programme was developed.

In preparation for the 2024 Spring decision-making process, more than eighty measures were submitted to the Minister for Climate and Energy in autumn 2023. The PBL gave an independent reflection on the proposals submitted and the initial evaluation of the fund manager. The proposals have been evaluated against the objectives of the Fund and the criteria (including effectiveness, efficiency, additionality and feasibility). Measures that followed from the integrated complementary climate package were added during the Spring decision-making process. A total of EUR 28.0 billion is mobilised for climate spending. This is covered by withdrawing EUR 24.6 billion from the Climate Fund, EUR 2.5 billion from the SDE windfall gains, EUR 350 million through the BZK budget (Coalition Agreement set of energy performance requirements for new industry) and EUR 528 million through the revenues of the Mobility Package.

This means that a large part of the fund has already been programmed in 2024, with the exception of the nuclear plot. Many of the expenditure are bookings. This requires further substantiation and development of the measure. Funds that are not spent will be returned to the Fund. Many measures are also granted under certain conditions. This must be met before the funds are transferred to the relevant national department. Both the Minister for Finance and the Minister for Climate and Energy are required to authorise the transfer of funds.

The Climate Fund allows for many additional climate spending. Recently, the General Court of Auditors found, after examination, that the statements of climate spending received by the Court are not always consistent. The purpose of the (draft) multiannual programme is to provide a clear overview of the planned expenditure from the Climate Fund. The final Multiannual Programme, together with the Fund's formal budget, was presented to Parliament on Prinsjesdag. Before funds are transferred, expenditure is always submitted for authorisation by the Lower and Upper House. The annual report of the Climate Fund will include a comprehensive account of the exhaustion of the funds made available from the Climate Fund.
This justification is also set out in the annual report of the department concerned to which the funds have been transferred.

The Act establishing the Climate Fund (Temporary Climate Fund Act) was adopted by the Senate on 19 December 2023. The Climate Fund was formalised on 1 February 2024. This means that the Climate Fund will have its own fund budget from this year onwards.

The process for the Multiannual Programme 2023 was launched in autumn 2025. In November 2023, government departments submitted proposals for measures to fund the Climate Fund. This could include both new measures and the development of reservations from the Multiannual Programme 2024. These were shared with the PBL and TNO for independent reflections. This led to the draft multiannual programme for 2025 published in parallel to the Spring decision-making in April 2024.125 The final Multiannual Programme will be published on PrinsjesDay in September 2024 at the Million's note.

State aid

To the extent that national aid measures involve State aid, the aim is to make use, as far as possible, of the possibilities offered by the General Block Exemption Regulation (GBER; reference: European Commission Regulation (EU) No 651/2014 of 17 June 2014 on certain categories of aid in application of Articles 107 and 108 of the

Treaty declared compatible with the internal market). Indeed, the GBER allows the granting of State aid which is relatively simple and rapid and subject to notification to the European Commission.
The European Commission has recently adopted a targeted revision of the GBER related to the green and digital transitions, which will enter into force in the short term. In cases where the GBER cannot be used, for example because proposed aid does not fall within the scope of the GBER or because the notification threshold is exceeded, this aid must be submitted to the European Commission for prior approval. The European Commission then assesses the proposed aid in the light of its State aid policy, as set out in various guidelines. In this context, the Guidelines on State aid for climate, environmental protection and energy 2022 (2022/C 80/01), the Temporary Crisis and Transition Framework for State Aid measures to support the economy following the Russian aggression against Ukraine (2023/C 101/03) and the Communication from the European Commission on Criteria for the assessment of the compatibility with the internal market of State aid to promote the execution of Important Projects of Common European Interest (IPCEI State aid framework, 2021/C 528/02) are relevant, among others.

125The Main Line Agreement is expected to change this policy. For more information, see the box on the main lines agreement in chapter 1 of the INEK.

Union Funds

The Multiannual Financial Framework 2021-2027 and Next Generation EU have different programmes and funds that contribute to national climate policies. Table 5.12 of paragraph 5.4 provides an overview of funds available in EU funds for climate and energy investments in the Netherlands.

ETS auction revenues

The auctioning of allowances in the ETS generates revenues for the Netherlands. The national budget has a separation of revenue and expenditure, meaning that specific revenue cannot be linked to specific expenditure. Thus, the ETS revenues are not spent for specific purposes, but are part of national revenues that also finance national climate policies. National spending on climate policy has a financial value higher than the ETS revenues that meet the requirements of the revised ETS Directive to spend all climate resources.

Recovery and Resilience Plan (HVP)

The ECOFIN Council approved the Dutch Recovery and Resilience Plan (HVP) in October 2022. In October 2023, the modified plan, including the extension of the REPowerEU chapter, was adopted. This has been mobilised by the EU to help EU countries recover from the coronavirus crisis. The Netherlands has included climate and energy measures in its Recovery and Resilience Plan. Part of the measures included in the Recovery and Resilience Plan are therefore part of the broader Dutch climate and energy policies and are included in this INEK. The Netherlands largely meets the climate requirements outlined in the Recovery and Resilience Facility Regulation.[135] The regulation states that at least 37 % of expenditure on reforms and investments should support climate objectives. This is currently 54.9 % in the RRP. The measures focus inter alia on the built environment, energy (market) and transport. All measures including milestones and targets are set out in the Addendum to the Council Implementing Decision HFP.[136]

II Renewable energy

I Policies and measures to achieve the national contribution

See Chapter 2.1.II.

II Specific measures for regional cooperation

See Chapter 1.4.

[135] Regulation (EU) 2023/435 of the European Parliament and of the Council of 27 February 2023 amending Regulation (EU) 2021/241 as regards REPowerEU chapters in recovery and resilience plans and amending Regulations (EU) No 1303/2013, (EU) 2021/1060 and (EU) 2021/1755, and Directive 2003/87/EC.

[136] Annex to the Proposal for a COUNCIL IMPLEMENTING DECISION amending Implementing Decision (EU) (ST 12275/22 INIT; ST 12275/22 INIT ADD 1) of 4 October 2022 on the approval of the assessment of the recovery and resilience plan for the Netherlands.

III Specific measures for financial support for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling and transport

The Netherlands has several incentive mechanisms for renewable energy. Key among these are: SDE + +.

The Sustainable Energy Production and Climate Transition (SDE + +) scheme focuses on large-scale deployment of renewable energy production techniques and other techniques that reduce carbon dioxide (CO2) emissions. This subsidy instrument contains a number of features that make the scheme work well according to international standards. These are the characteristics of technology neutrality, competition between them, cost-effectiveness and multiannual certainty for investors.

In 2020, the scheme was broadened so that, in addition to renewable energy production, CO2reducing techniques are eligible for subsidy. These include technologies such as CCS and CCU, hydrogen production through electrolysis and renewable heat production through industrial heat pumps and electric boilers, among others. In addition, the SDE + + focuses on the realisation of eligible production from wind on land and zon-PV (> 15 kilowatt).

In line with the Coalition Agreement, the government, when designing policy measures, aims to achieve a 60 % emission reduction by 2030. The SDE + + makes an important contribution to achieving it cost-effectively. The SDE + + therefore focuses on emission reductions on Dutch territory. The SDE + + encourages the deployment of market-ready and relatively large scale CO2reducing techniques by covering the unprofitable top of these techniques through an operating subsidy.

The opening rounds of 2020, 2021, 2022 and 2023 opened EUR 4 billion, EUR 5 billion, EUR 13 billion and EUR 8 billion respectively. It is expected that the projects at their disposal, if they all materialise, jointly achieve 9.72 megaton of CO2eq/y reduction per year. The Netherlands plans to open the SDE + + in 2024 with a budget of EUR 11.5 billion.

Since the widening of the SDE + to the SDE + + in 2020, there are opportunities for industry to take additional steps in the relatively short term. Due to the size of CCS's CO2reduction potential and the ability to reduce CO2 in a relatively short term and cost-effective manner, the cap for CCS in industry for the SDE + + scheme has been abandoned as of the SDE + + 2023. The "fences" (see next paragraph) were introduced in 2023, leaving sufficient budget for other less cost-effective techniques in the SDE + +.

Since the 2023 SDE + + application round, the so-called 'fences' have made techniques for the production of low-temperature heat, high temperature heat and molecules more likely to be subsidised, as they are still less profitable but can achieve cost reductions in the long term and are of great importance for the climate transition. Part of the opening budget of the SDE + + 2023 was reserved for these technical groups. Fences will be used again in the SDE + + 2024.

The government has decided to open a budget of EUR 11.5 billion in 2024 on the basis of current insights into cash estimates. Part of the SDE + + funds is also earmarked for an opening budget of EUR 8 billion in 2025. This will give additional impetus to the CO2 reducingtechniques, such as the deployment of renewable electricity, renewable heat and CCS deployment. These techniques support the transition for all sectors. In doing so, the Cabinet will also look at the expected projects and available cash space, as usual. This leaves sufficient room for these projects in the SDE + + according to current insights beyond 2025.

The SDE (+) (+) were financed until 2023 by the Sustainable Energy Storage (ODE). Expenditure on the SDE schemes was covered by a levy on energy consumption by households and businesses: the Sustainable Energy and Climate Transition Storage (ODE). The ODE's revenue was allocated to the general budget, and in principle was intended to cover the total cash expenditure for the SDE + (+). This link has been lifted as of 2023. The rate for the ODE is set at zero, and the tax is included in the energy tax. Therefore, since 2023, there is no longer any link between the ODE rates and the SDE resources and the SDE + + is financed from funds from the ESA budget.

SCE

In addition to the SDE + + scheme, the Co-operative Energy Generation Subsidy Scheme (SCE) specifically aims at helping energy cooperatives and Associations of Eigeners (VVUs) to carry out small-scale sustainable solar, wind and hydropower projects with local ownership. This will enable more renewable electricity to be produced in the short term and encourage local participation.

The projects considered for the SCE shall be local and cooperative. There are requirements to ensure that the project is organised by a sufficient number of participants in the neighbourhood. The subsidy is paid on the basis of the actual amount of renewable electricity produced. Like the SDE + +, the subsidy is aimed at the 'unprofitable top' of the project compared to the market price of electricity. During the 2021 SCE round, EUR 92 million was made available and more than 650 cooperative projects received grants. In the 2022 SCE round, EUR 150 million was made available and more than 130 projects have been supported. The 2023 SCE round, with an opening budget of EUR 150 million, resulted in over 400 supported projects. The 2024 SCE round is currently open with a budget of EUR 100 million.

HER +

The Renewable Energy Transition Subsidy (HER +) aims to achieve the energy targets in 2030 more cost-effectively through innovative projects. An HER + project should result in a CO2reduction by 2030.
This is done by subsidising innovative renewable energy production projects through technologies such as wind, solar PV and renewable gas. In this case, the energy generated is equivalent to a certain amount of CO2reduction. In addition to renewable energy production techniques, it is also possible to subsidise innovative projects for other CO2reducing techniques. For example, CCS, hydrogen production and electric boilers. These techniques have been added to accelerate the reduction of CO2towards climate goals. Due to the addition of these techniques, the HER has been renamed after HER +.

Renewable energy projects should lead to renewable energy production in 2030 and savings in future expenditure on subsidies under the SDE + +. This saving must be greater than the grant requested for the project.

In the Spring decision-making process, it was decided to continue the HER + until 2027 through the Demonstration of Energy and Climate Innovation (DEI +) and Energy/Mission-driven Research, Development and Innovation Summit (TSE/MOOI).]

Early upscaling phase

The Coalition Agreement agreed under the Climate Fund to indicatively earmark EUR 15 billion for scaling up climate-neutral production technologies such as high-end renewable energy carriers. Under that agreement, schemes shall be developed from the allocated and earmarked resources of the draft multiannual climate fund for 2024 and 2025 for, inter alia, the promotion of hydrogen production through

electrolysis, green gas production, renewable fuels through gasification, geothermal, and biopyrolysis, Alcohol-to-Jet and e-fuels for the production of sustainable aviation and maritime fuels. In addition, measures to promote the use of renewable energy in mobility and on inland waterway and seagoing vessels are being developed. These schemes will provide an additional boost to the share of renewable energy.

DEI +

The Demonstration of Energy and Climate Innovation (DEI +) aims to support pilot and demonstration projects that contribute to the cost-effective reduction of CO2emissions by 2030. Research, development and demonstration of new or improved renewable energy generation technologies are supported by the energy innovation schemes. In addition to new, more efficient and cheaper reprocessing technologies, innovation policy on renewable energy is also highly targeted integration in the energy system (such as storage and conversion to energy carriers), spatial integration (such as multiple space use within energy parks) and environmental integration (such as mitigating the impact of wind energy on birds). Innovation policy is further explained in the sections on "Research, innovation and competitiveness" (chapters 2.5 and 3.5).

The DEI + scheme was reopened at the end of 2023, taking over the renewed block exemption in the Environmental Guidelines at the beginning of 2023. This increases the maximum grant amount to EUR 30 million and updates themes such as circular economy, CCUS and sustainable fuels.

ISDE

The Sustainable Energy and Energy Savings Investment Subsidy (ISDE) provides a subsidy for investments for five different types of interventions: (1) (hybrid) heat pumps, (2) solar boilers, (3) insulation measures, (4) heat connections, and (5) electrical cooking device. The subsidy for (hybrid) heat pumps and solar boilers is available to business operators and owner-occupiers. The subsidy for insulation measures, heat connections and electric cooking is only available to owner-occupiers. These are flat-rate subsidy amounts laid down in the scheme.

The grant will be opened annually. This year, ISDE has been opened for EUR 600 million. EUR 5 million is available for ISDE subsidy for small wind turbines this year. The Dutch Recovery and Resilience Plan (HVP) of 2022 includes an extension of the investment subsidy Sustainable Energy and Energy Savings (ISDE). The financing of ISDE has been further expanded in response to the REPowerEU package.

EIA

The Energy Investment Deduction (EIA) is a tax scheme for entrepreneurs investing in energy saving assets and reducing greenhouse gas emissions. The EIA allows the trader to deduct from taxable profits 40 % (from 2024 onwards) of the cost of these assets. As a result, these entrepreneurs pay less income tax or corporation tax. This tax advantage is a financial incentive contributing to the public objectives of energy saving, renewable energy and reduction of CO2emissions. The assets that can be notified to the EIA are included in the Energy List, which is updated annually.

The subsidy scheme promotes sustainable energy and climate transition (SDE + +) promotes the development of renewable energy in a broad sense. The EIA also introduced a tax deduction for renewable electricity generation (solar panels; for the investment in a grid connection for solar panels for which SDE + + has been requested; for solar panels without connection to the public electricity network; for solar panels or solar film on transport equipment). A deduction is also included for sustainable heating systems (solar collectors; heat/cold storage in so-called aquifers; groundwater exchangers).

If an economic operator makes use of the EIA, this is taken into account when awarding the SDE + + grant in order to avoid overstimulation.

Mia and Vamil

The Environmental Investment Deduction (MIA) and the Environmental Investment War (Vamil) are tax advantages for entrepreneurs investing in environmentally friendly assets.

The Environmental Investment Deduction (MIA) allows entrepreneurs to deduct up to 45 % of the investment amount from profits. The percentage of deduction depends on the environmental impact and the prevalence of the asset. The Vamil allows entrepreneurs to amortise an investment at any time. The random depreciation is limited to 75 %.

The MIA and Vamil are two different schemes but are often combined. Both schemes use a common list, the Environmental List. This list includes all assets eligible for MIA and/or Vamil. A new Environmental List is published every year.

IV Assessment of support for electricity from renewable sources

The Netherlands regularly assesses the relevant support mechanisms to stimulate the production of renewable energy, including electricity. In 2023, the SDE + was evaluated. The evaluation focused on the period from 2020 to 2022. Most of the budget spent in this period has not

yet led to project implementation because the implementation deadline has not yet expired. This limits the extent to which the investigation can lead to robust conclusions.

The evaluation examined the effectiveness and efficiency of the SDE + + and the consistency of the SDE + + with other national and European policies. The study concludes that the effectiveness of the SDE + + is high, but that rejections and withdrawals of applications lead to under-spending. Most projects would not have been carried out without the SDE + +. There are some doubts about this in the case of zon-PV and onshore wind.
In order to increase efficiency, the provision of information for techniques could be improved, a compulsory implementation agreement and bank guarantee for more techniques could be introduced, as well as an additional contribution in the event of major cost increases. The SDE + + has sufficient efficiency assurance in the system, but the scope for excess profits can be reduced. Consistency is reduced by the fact that the SDE + + focuses on cost-effective CO2reduction, while the Climate Agreement also requires the deployment of more expensive techniques. The recently introduced fences address this.

The evaluation did not lead to any adjustments to the SDE + +. However, new tools for zon-PV and onshore wind (2-way contracts for difference) are currently being developed to limit overstimulation in the future. In order to reduce the risk of overstimulation, a measure will already be introduced as of 2024: the Excess Profit limitation. This means that in the case of excess profits, a set-off may be made against grant advances received in the past or advances paid in the future. It is expected that zon-PV and onshore wind will still need support due, inter alia, to volatile electricity revenues and higher financing risk if the support from the SDE + + is removed. Research suggests that a 2-way contract for difference, compared to other aid instruments, offers most investment certainty combined with the lowest risk of overstimulation. With the transition to a 2-way contract for difference for zon-PV and onshore wind, the Netherlands is in line with the new European standard from the EMD. The introduction of 2-way contracts for difference is still subject to legal possibilities.

Adjustments to the scheme will be extended with the European Commission (DG Competition).
The addition of new techniques to the SDE + + is submitted to the European Commission, as well as changes to the system, such as the addition of fences in 2023. The SDE + + will also be assessed in 2023 under the new State aid guidelines (CEEAG).

There is an annual independent advisory path on the categories of technologies and levels of incentives and their effectiveness. An extensive market consultation is also carried out as part of this independent advisory process. In addition, Parliament is informed twice a year about the outcome of the applications and had projects available, also taking into account the cost effects. This shows the distributional effects (to which the amount of the subsidy is spent) of the revenue from the stimulation. Distributional impacts shall be regularly identified and evaluated.

v Specific measures for the introduction of one or more contact points, streamlining administrative procedures, providing information and training, and promoting the use of power purchase agreements

The Netherlands has examined whether there are obstacles to entering into PPAs, this does not appear to be the case. This is currently being reviewed in the context of the EHR proposal. Chapter 2.2.II describes how the Dutch administration streamlines administrative procedures. Chapter 1.2.II describes the steps taken by the Netherlands to ensure high-quality training for the energy transition. The ‘Save the button’ campaign informs citizens about the possibilities for sustainability and saving (see also Chapter 3.2.IV).

VI Summary of policies and measures to develop renewable self-consumption and promotion of renewable energy communities

The Netherlands currently encourages renewable self-consumption by means of a fiscal measure for solar panels in small consumers. In addition to a 0 % VAT rate for the supply and installation of solar panels on or near a dwelling, owners of solar panels connected to a retail connection can benefit from the so-called “netting scheme”. Electricity from renewable energy generation fed back to the grid shall be deducted from the electricity taken from the grid. As a result, the retail consumer does not have to pay supply costs, energy tax and VAT on electricity taken from the electricity network to the extent that it is offset against electricity returned to the grid. For electricity that cannot be netted, the consumer shall receive reasonable compensation from the energy supplier. The sustainability requirements imposed on dwellings are also an incentive for homeowners to purchase solar panels, and in the case of landlords, to create self-consumption opportunities for their tenants. In addition, renewable self-consumption is promoted through grants and loan facilities at various levels of government.

As already indicated, energy cooperatives and FTEs may also use the Subsidieregeling Coöperatieve Energieproduktie (SCE). The SCE encourages energy cooperatives and associations of owners (VVUs) to generate renewable electricity from solar, wind or hydropower locally and in a cooperative manner through small-scale projects. Like the SDE + +, the SCE covers the unprofitable top up by means of an operating grant. The subsidy is paid in the form of an amount per kilowatt-hour produced.

VII Assessment of the need for the construction of new renewable district heating and cooling infrastructure

The Netherlands plans to make new connections to heat networks in 2030 500.000 (about doubling compared to 2020). This requires new

infrastructure. A large part of these new networks will be fed from renewable sources. The proposed Collective Heat Act will introduce requirements for the sustainability of heat networks. These requirements become more stringent over time. For the development of these networks, the Warmtenetten Investment Subsidy (WIS) has been available since June 2023. The deployment of renewable sources is difficult for existing heat networks, partly because the supply temperature is too high. In new networks, the temperature that can be supplied by a sustainable source can be taken into account at the time of construction. With these new networks, renewable heat sources, such as geothermal and aquathermia, can grow up.

III Other elements of the dimension

I National policies and measures impacting ETS sectors

The ETS does not have a national target or obligation, but the national targets set out in the Dutch Climate Law include both ETS and non-ETS emissions. Following the revision according to the European Commission's "Fit-for-55 package", the ETS includes emissions from industry, electricity, mobility (including aviation and maritime) and the built environment, together around 4/5 of total Dutch greenhouse gas emissions. In addition, the opt-in under ETS2 is used for additional sectors. Many of the national climate and energy policies and measures in these sectors (as described above) contribute to the European targets for the ETS.

Co2 – minimumprice of electricity

The Netherlands has a CO2minimum price for CO2 emitted from electricity production by ETS companies with the Act on minimum CO2price for electricity generation. This measure provides certainty to RES-E investors on the future CO2price. This guarantee has a positive impact on the cost of capital (WACC) of these investments, making these sustainable investments more competitive with the fossil alternatives. Since the introduction of the CO2minimum price for electricity generation, the ETS price has increased significantly.

Co2 – minimumprice for industry

Since January 2023, in addition to the CO2minimum price for electricity production, a CO2minimum price for industry has also been introduced. The Netherlands introduced this CO2 minimumprice for industry in the same way as the price path of the CO2minimum price for the production of electricity:

1	2023	2024	2025	2026	2027	2028	2029	2030
Rate126	16,40	18,00	19,80	21,80	24,00	26,40	29,00	31,90
ETS price127	78,09	81,96	86,02	90,37	94,90	99,62	104,63	109,82

* Euro per tonne CO2

* * PBL estimate (Source: National Climate and Energy Outlook, PBL 2022)

National CO2industry levy

A national CO2levy has been in place since 2021 to ensure that the target of 18.3 megaton emission reductions in industry compared to the PBL baseline in 2030 will be achieved. The coalition agreement provides for the reduction of emissions guaranteed by the 4 megatone tax to be increased from 14.3 megatons to 18.3 megatons. To this end, the national reduction factor has already been adjusted to tax the target quantity of emissions. In addition to the quantity, the amount of the levy is also important for achieving the 18.3 megaton target in 2030. An evaluation of the CO2levy is planned in 2024. The purpose of the levy is not to generate revenue, but to encourage companies to make the investments in the Netherlands. Should the levy generate revenue, it will be used to green industry through a return lock via the Climate Fund.

II Policy initiatives and measures to achieve other national objectives

Circular Economy

In a circular economy, we will be resource-efficient and smart with raw materials and products. We use less raw materials because we use products for longer. We redirect used raw materials to new products.

We also choose to replenish raw materials. This makes a substantial contribution to reducing and preventing CO2emissions. It reduces the CO2footprint of businesses and citizens, with a positive impact on biodiversity, clean environment (reduction of environmental damage) and security of supply of raw materials (including critical metals for the energy transition) in addition to emissions reduction. With a package of policies focusing on the circular economy, we strongly contribute to achieving the 60 % CO2reduction target set in the Coalition

126The Coalition Agreement agreed to introduce a CO2minimum price for industry. The CO2 minimumprice industry has not been introduced to actually achieve CO2reduction, but to provide investment certainty for sustainability.

Agreement, climate neutrality by 2050 and the energy transition.

National Programme Circular Economy 2023-2030

In February 2023, the Cabinet, under the coordination of the State Secretary for Infrastructure and Water Management, sent the National Programme Circular Economy 2023-2030 to the Chamber. This programme builds on the Circular Economy Implementation Programme 2019-2023, which includes the ambition of the Cabinet to make the Netherlands circular in 2050, and has been developed in five transition agendas (Consumer Goods, Plastics, Construction, MaakIndustry and Biomassa and Food).

The National Programme for Circular Economy (NPCE) contains generic measures to improve the economy of raw materials in the coming years, focusing on four points of interest: (1) reducing the use of raw materials, (2) substitution of raw materials, (3) lifetime extension of products and components and (4) high quality processing. In addition, the NPCE contains specific measures for priority product chains and support measures.
Support measures include, for example, circular entrepreneurship, encouraging behavioural change among consumers and education.

In addition to the input for the climate goal and the coherence between circularity and climate policies, it has also been indicated how the circular economy contributes to restoring biodiversity, a cleaner environment and healthy living environment and increasing the security of supply of raw materials.

Measures for the ambitious climate target

The Netherlands sees a potential of 2 to 4 megatons of CO2emissions reduction that can be achieved in the Netherlands by policies aimed at boosting the circular economy. In the Spring decision-making of 2023 and 2024, the government took additional measures in the area of circular economy in line with the NPCE. Seven measures are included to promote a circular industry (see heading Industry 3.1.I.i). Three measures focus on the standardisation and promotion of bio-based construction, circular land, civil engineering, and circular demolition, and are thus at the intersection of industry and built environment. These measures can contribute to national climate goals in the short term, guide both the front and the back of the chain and include flanking policies focusing on knowledge building, innovation, skills and behaviour.

In addition, the government intends to work towards sustainable and circular chains that contribute to both the national and global climate challenges by valuing chain emission reductions. The government is therefore committed to reducing the greenhouse gas footprint of the Netherlands. The greenhouse gas footprint uses a chain approach to identify which emissions can be reduced by Dutch citizens and businesses. The footprint also gives an insight into the emissions in the chains where Dutch companies have a business perspective to reduce them.

In the 2024 Spring decision-making process, the government agreed steps in three areas to make the use of raw materials more circular and thus contribute to the climate challenge. This will strengthen the sustainability of carbon use in chemistry in particular by advocating European policies and exploring what further needs. It was also agreed to set higher circular ambitions in the Rijksinkoop and to examine how exactly to fill it. Thirdly, in subsidy schemes and other climate policy instruments, the government wants to make circular resource use a precondition. To this end, it will explore what the market can already deliver and what is needed to establish such conditions, such as certification of recycled raw materials.

Better articulation of circularity and climate policy

The government sees several opportunities for further strengthening between the circular economy and climate and energy policies. Circularity is also taken into account in the elaboration of the National Climate Fund, including the tailor-made arrangements. It also integrates and uses ongoing National Growth Fund programmes contributing to circularity. Several existing subsidy schemes are also analysed in a (even better) place for circularity as a focus or enabling condition. In addition, the Netherlands sees opportunities for circular economy in the different climate sectors and beyond. For example, in the energy transition, it is crucial to design circular solutions related to the security of supply of critical metals and other essential raw materials, and to ensure that they do not end up in waste incineration plants or abroad. This is an important link with the National Raw Materials Strategy. Therefore, one of the draft principles of the National Energy System Plan is to set conditions for the circular and sustainable use of raw materials in the future energy system.

Exemplary role of government

Public authorities have an exemplary role in driving and helping to achieve a circular economy. In addition, the government also takes this exemplary role with co-governments and wants to scale up market innovations. For example, attention from the Ministry of Infrastructure and Water Management is specifically aimed at achieving a climate-neutral and circular infrastructure by 2030. This is an additional possibility for public authorities to play a proactive role in the early phase scaling up of innovations. Upscaling entails additional costs in the first instance and is therefore available depending on the resources; by achieving a

sufficient scale, the additional costs are reduced. The government strongly calls for business and civil society to also play an exemplary role.

III Policy initiatives and measures to shift towards low-emission mobility (including electrification of transport)

See mobility section in Chapter 3.1.I.i.

IV National policies, timetables and measures for phasing out energy subsidies, in particular for fossil fuels

For this, see the section phasing out fossil subsidies and fiscal greening in the section cross-sector in chapter 3.1.I.i.

3.2 energy efficiency dimension

This section describes the planned policies, measures and programmes to achieve the indicative national energy efficiency contributions 2030 as well as energy savings obligation. Annex 6 includes the Potential Analyse Warmte koude, as requested in Article 25 EED.

I Energy efficiency obligation schemes and alternative policy measures under Article 8 of Directive (EU) 2023/1791 and to be adopted in accordance with Annex V

Article 8 of the current EED requires Member States of the European Union (2018 (2023)) to save final energy consumption through national policies. The cumulative saving target from 2021 to 2030 is 1.285 petajoules, which is 361 petajoules higher than the previous target of 924 petajoules. The Netherlands determined the cumulative energy savings in the period 2021-2030, assuming (the minimum) 0.8 % of final energy consumption in the years 2021 to 2023, 1.3 % in the years 2024 and 2025, 1.5 % in the years 2026 and 2027 and 1.9 % in the years 2028 to 2030. Adding these results in cumulative energy savings in the period 2021 to 2030.

Table 3.1: Cumulative energy savings in the period 2021 to 2030 (objective Article 8)

1	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Multiplier (number of years in which savings are counted)	10	9	8	7	6	5	4	3	2	1	55
annual savings including multiplier (petajoule)	162	146	130	184	158	152	122	115	77	38	1285

The Netherlands has opted for alternative savings measures (according to Article 8(2)) to fulfil the energy savings obligation under Article 8(1). The current Dutch energy and climate policy is anchored in the Regeer Agreement 2022, the Climate Plan 2021-2030 and the Climate Law. The 2021-2030 Climate Plan contains many commitments on actions taken and new policies that will be implemented to achieve the climate target of a 55 % reduction in greenhouse gas emissions by 2030. Many of these policy measures will contribute to the achievement of the energy savings obligation under Article 8. In addition to new policy measures, a number of existing policies (adapted or not) will continue beyond 2020.

A specification of which policy measures ex post The Netherlands counts for Article 8 and whichcalculation methods are used is indicated in the overview of policy measures (Annex 2) in the Energy Savings Methodology document (see Annex 3). This is calculated ex ante in the Climate and Energy Exploration (KEV).

Efficient heating cooling in the Netherlands 2023		
	Volume (GJ)	Percentage
Efficient heat and cold networks	20.030.557	90.6 %
non-efficient heat and cold networks	2.077.915	9.4 %
Total	22.108.472	100 %

Industry

For the industry sector, there are several policy instruments that are being deployed. On the one hand, industrial companies are facing the energy saving obligation. This is described in more detail above. In addition to the ETS, the Netherlands introduced a national CO2levy for industry which in 2030 is significantly higher than the ETS price to ensure additional reductions. With the largest industrial companies, tailor-made arrangements are also made to achieve additional CO2 reduction and sustainability.

In addition to obligations and pricing, industry in the Netherlands is also supported to save energy.
For example, companies can benefit from the Accelerated Climate Investment Industry (VEKI) subsidy scheme, which has been earmarked for EUR 2 024 130 million. For more innovative projects, industry can benefit from the Demonstratie Energie Innovatie (DEI +) grant scheme, which is budgeted in EUR 2 024 141 million.

[137] parliamentary Document 27879, No 94.

Industrial companies can also benefit from tax schemes such as the Energy Investment Deduction (EIA) and the Environmental Investment Deduction (MIA/Vamil). Finally, companies are entitled to the Stimulering Duurzame Energie Production (SDE + +) and the National Investment Scheme for Climate Projects Industry (NIKI), which is currently developed in addition to the SDE + +.

Compliance with Article 11 is progressing well in the Netherlands. In the period 2019-2023, 2.734 EED audit reports were submitted, including ISO certification. A penalty order was sent to 64 companies, two of which were forfeited. All files were closed at the beginning of 2024.

In accordance with Article 26.3, the Netherlands provides information on the choice of criteria 2 for efficient district heating and cooling. Criterion 2, as defined in Article 26(2) of Directive (EU) 2023/1791, refers to sustainability performance criteria, specifically aimed at measuring the greenhouse gas emissions of the district heating and cooling system per unit of heat or cold supplied to customers. In addition, the Netherlands complies with the obligation under Article 24(4) of Directive (EU) 2018/2001. Below are the details on how the Netherlands complies with the 90 % efficient district heating obligation.

Mobility

There is a subsidy in the Netherlands for the purchase of electric passenger cars, both first-hand and second-hand. In addition, for business users, there is a Subsidieregeling Emissile Bedrijfsauto (SEBA) scheme and a subsidy scheme for the sustainability of inland waterway vessels. In order to achieve the desired acceleration towards zero-emission freight transport in 2050, it is no longer necessary to convert an existing vehicle. Operators are now able to purchase a new zero-emission vehicle from the dealer. The Netherlands therefore announced a purchase subsidy ZeroEmission Trucks (inception) in 2021. This should make it more attractive for an undertaking, considering the purchase of a new lorry, to purchase an zero-emission lorry with battery or hydrogen electric propulsion. To that end, the scheme reimburses part of the additional costs of an zero-emission lorry (class N2 and N3) compared to a diesel lorry.

As indicated in Chapter 3 under Mobility, parties are in the process of transitioning to cleaner construction equipment under the Schoon and Emissieloos Bouwen programme. More than 1 billion in resources and various instruments will deploy the transition to cleaner, and in the long term zero-emission, construction equipment. Lighter equipment electrifices faster than heavier equipment. Electrification delivers energy efficiency. In addition, the knowledge programme develops, inter alia, guidance to reduce the use of equipment, optimisation of processes or other material use. This will also lead to a more efficient use of energy. As mentioned in section 3 under mobility, there is also a specific allowance for local authorities for zero-emission buses.

Agriculture

The largest energy demand in agriculture comes from glasshouse horticulture. This sector is engaged in energy saving in various ways. First, as of 2023, greenhouse horticulture companies will be subject to the energy saving obligation. In addition, an energy transition agreement was signed in 2022 by the glasshouse horticulture sector and the public authorities to agree on how to make the sector more sustainable, setting the target of saving energy by 2030 of around 20 % by 2030 and 30 % by 2040 compared to the average for 2015-2017.[Finally], the energy efficiency greenhouse horticulture subsidy scheme (EC) and market introduction of energy innovations in glasshouse horticulture (MEI) will be opened every year to encourage the uptake of energy-saving measures and innovation in this area.

II Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings (both public and private) in accordance with Article 2a of Directive 2010/31/EU (EPBD)

The long-term renovation strategy was last presented to the European Commission on 9 March 2020.
The next long-term renovation strategy will be drawn up in response to the new EPBD. The reporting obligation will be called the National Building Renovation Plan (NGRP). EPBD has been recently adopted and published. The first concept of NGRP will have to be finalised by 31 December 2025. Chapter 3.1 (Dimensionof decarbonisation) explains in more detail the policy on the built environment and the relevant milestones for energy savings in the building stock.

III Policies and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers to the use of energy performance contracting and other energy efficiency service models

The Netherlands encourages and subsidises an initiative to develop a new open standard to make business buildings more sustainable on the basis of an energy performance guarantee. Financing takes place by reducing energy costs. It was launched in 2023 and could be further scaled up if successful.

IV Other planned policies, measures and programmes

National Energy Savings Programme

In the revision of the Energy Efficiency Directive, an agreement was reached in 2023 to reduce energy consumption in the EU by 11.7 % in 2030 compared to expected energy consumption in 2030. This also gives rise to a national contribution with an indicative target value of the Netherlands in 2030. For the Netherlands, the final and primary consumption targets are lower than the current energy use. Therefore, since 2023 the government has been working on a National Energy Savings Programme to achieve this EED target. In preparation for this programme, a study has been launched looking at cost-effective savings potential with a breakdown into sectoral targets.

Emergency ordinances reduce consumption of gas and electricity

In order to increase the security of gas supply, the European Union adopted Emergency Ordinance 2022/1369 in August 2022. All European Member States are encouraged to save 15 % of gas compared to the average of the last five years. Initially, the measurement obligation under this Regulation ran from August 2022 to March 2023. However, the Regulation has been transposed into a Council Recommendation. In the period up to January, gas savings in the EU amounted to 19 %,[while 138] the highest savings were achieved in Finland (-57 %) and the lowest in Malta (+ 12 %). The Netherlands saved 30 % of gas. The largest savings have been achieved in industry, closely followed by households.139

Around one third of the savings are due to the mild winter. Part of the savings is likely to be caused by high energy bills, which has reduced gas consumption by businesses and citizens. Through the campaign Zet the button, the government has also provided tips to households and businesses to save energy. Many measures have been implemented after several interviews with industries and co-governments, which seem to bear fruit. Figures from Statistics Netherlands show that the Dutch industry produced more during the period under review. It is therefore likely that savings will be achieved not only by stopping processes and switching energy carriers, but also because of efficient measures.

As gas is also used for electricity generation, the European Union has also agreed to reduce electricity consumption. Between November 2022 and March 2023, Member States were expected to save 10 % of electricity compared to the average consumption in the same month over the last five years. During peak hours, when electricity is most expensive and gas is widely used, there was a mandatory reduction of 5 % compared to the average consumption during peak hours in the last five years. This Regulation has not been further extended.

[138] https://ec.europa.eu/eurostat/web/products-eurostat-news/w/DDN-20230221-1.

[139] Gas consumption in the Netherlands in 2022 lowest in 50 years (cbs.nl).

The Netherlands saved 7.8 % during peak hours, well above the target. By allowing electrification to be taken into account, the Netherlands has achieved 9.8 % savings on a monthly basis. This emergency regulation uses the same tools as for gas savings.

To inform citizens, businesses and civil society organisations/institutions about energy savings, the communication campaign Zet also De Knop om was launched in spring 2022. The campaign provides quick tips on how to save energy directly, but also helps to find the right information on more structural energy-saving measures, advisory counters and support. It also helps businesses and institutions understand what rules they have to comply with and what financial support is available to help them do so. The campaign will be extended in 2024, with a focus on climate-wide rather than mainly saving. Several impact measurements show that the campaign has been effective.

The Netherlands also has specific measures to support SMEs in the field of energy saving. In 2024, the debilitating programme will start. Within this programme, an entrepreneur is actively searched and supported in understanding how to save energy and make them more sustainable and in implementing the necessary measures. The main credit scheme for sustainability in SMEs is the green window in SMEs (SME Groen). The SME Green will be monitored and will be highlighted in the 2021-2025 evaluation of the whole SME scheme. The effectiveness of the SME Groen cannot be assessed at this stage because the alternative financiers, and the banks from February this year, only make it possible to make use of this guarantee. However, this credit scheme focuses precisely on the need for credit collected from SMEs and lenders.

Finally, a programme of energy savings will be launched in 2024, which will inter alia discuss the indicative national targets for each sector. The aim of the programme is to give energy savings, alongsideCO_2 reduction, a clear role in our climate and energy policies. Energy saving is an important pillar for a sustainable energy system.

v Description of policies and measures to promote the role of local energy communities in implementing the policies and measures referred to in points (i), (ii), (iii) and (iv)

See the explanatory note to the Subsidieregeling Coöperatieve Energieproduktie (SCE) under Chapter 3.1.II.iii and 3.1.II.vi.

VI Description of measures to develop measures to exploit the energy efficiency potential of gas and electricity infrastructure

In the Kamerbrief of July 2022[140], the government expressed the ambition of producing at least two billion cubic metres (2030 bcm) of green gas in the Netherlands every year as of 2.

Optimisation (including reliability and fitting-out) of the national gas network is carried out under the control of Gaover Transport Services (TSG). Significant investments in the gas system are submitted to the market and assessed by ACM and the Minister of EZK, the so-called Investment Plan/IP. This is a 10-year plan, which can be adapted through addenda and revised 2 annually. The current Dutch natural gas infrastructure, both on land and at sea, offers – in addition to blending with green gas – great opportunities for reuse, both for CCS and hydrogen applications. This concerns not only pipelines and gas stations, but also LNG import terminals.

However, adjustments (especially technical) need to be made, which should be planned in a timely manner and which will require investment. The final (land-based) hydrogen network is expected to be largely composed of existing natural gas pipelines (around 85 %) of TSG. These lines are now part of the TSG natural gas network. Studies show that the pipes can be technically adapted so that hydrogen can also be transported safely.

Gas storage devices in salt domes (cavernes) can be converted/prepared for hydrogen storage.
EnergyStock (daughter of Gasunie) is preparing for this in Zuidwending (near Veendam). In line with current planning, the installation with a first caverne will be operational in 2028. Three more cavernes will be implemented soon after 2030, in line with the growth of the renewable hydrogen market. Hydrogen storage shall be accessible to all parties wishing to store hydrogen; short or longer term.

It should be noted that it is still difficult for market players to assess when the transition to sustainable energy carriers can be made.[141] This depends, inter alia, on the increase in demand for (and at the same time a sharp increase in the supply of) these energy carriers. Competition for the supply of 'own' (Dutch) hydrogen production coupled with offshore wind farms (via

[140] parliamentary Document 32813, No 1063.

electrolysers) also plays a role. The government has previously expressed its ambitions in the field of hydrogen production, including through the National Hydrogen Programme (NWP). The rapid expansion of the hydrogen economy will rapidly reduce the use and demand of LNG, and terminal owners will be challenged to "switch" quickly.

The Electricity Regulation requires that the regulatory methodology of electricity system operators provides appropriate incentives for energy efficiency. ACM regulates energy tariffs. The costs for network losses of electricity and gas are part of the total costs that ACM takes into account in the regulation. By increasing returns on network operators if they reduce their costs, they have an incentive to reduce the costs of network losses. The cost of network losses is the volume and purchase price of the electricity/gas. If a system operator is able to reduce the volumes of network losses, it contributes to energy efficiency.

- ### II Possible regional cooperation in this field

See Chapter 1.4.

- ### III Financial measures in this area at national level, including Union support and the use of Union funds

The PVGO includes financial measures to improve the cost-effectiveness of interventions in buildings and increase the investment capacity and willingness of building owners. In addition, the Dutch approach includes several other measures that help to promote the financing of investments. Key instruments include:

- The Construction Flows Programme. This is a further development of the Renovation Accelerator (Renovation Accelerator), a programme that was developed earlier to promote the integration of projects into larger, more easily bankable investments. A portfolio approach has also been developed for owners of non-residential buildings to accelerate their portfolio.
- Municipal heat plans and standards for buildings. These provide certainty to parties and thus reduce the risk for public and private investors. This certainty is important because the risks of investments are often difficult to assess. This is due, among other things, to a lack of understanding of future energy systems and the requirements that a building must meet for the future.
- Pooling public and private money into the Heat Fund, enabling attractive financing for building owners. The combination of public and private funds provides a structure in which a lot of funding can be made available (through participation of private parties) and risks are shared (through public participation).
- Working with public sector roadmap. These make it possible to carry out targeted investments in improving public buildings. A revolving fund is also being set up to help finance investments in public buildings.
- Support building owners in their investment decisions, for example with the platform upgrade.nl and with care arrangements. This will provide building owners with a one-stop shop and support in the sustainability of buildings.

For other financial measures, see Chapter 3.1.II.iii.

[141] parliamentary Document 29023, No 417.

3.3 energy security dimension

I Policies and measures relating to the elements in point 2.3

Saving energy is the first step in resolving grid congestion, which also reduces energy bills for businesses and households, reduces our dependence on third countries for fossil fuels and saves the climate. It is essential for energy affordability for citizens, for a stable business environment for our businesses and for a robust development of our national energy system. The use of less energy reduces the pressure on the grid and therefore actively promotes energy savings and energy efficiency in the sectors of industry, mobility, built environment, and agriculture.

The Netherlands has a great potential to produce renewable electricity. An important element of energy security for the Netherlands is the ability to store renewable electricity on a large scale and long term. The development of power to gas is crucial in order to maintain a large part of its own energy needs, while the storage of renewable electricity in the form of a gas provides flexibility for the electricity system and a renewable energy carrier for the sustainability of transport and mobility, industry and the built environment. Reducing electricity imports is not an objective in itself for the Netherlands. The Netherlands is of the opinion that further integration of the European electricity market can contribute to continuing to ensure security of supply in an energy system in transition to a climate-neutral energy supply.

For electricity, there are no targets for increasing the diversification of energy sources and suppliers from third countries. Nevertheless, the objectives for decarbonisation and expansion of the share of renewable energy generated lead to a change and further diversification of generation techniques in the electricity market. See paragraphs 2.1.I and 2.1.II. According to the KEV2022 (adopted and planned policies), the estimated increase in renewable electricity generation leads to around 60 % of Dutch electricity consumption being generated from renewable energy in the Netherlands in 2025 and around 85 % in 2030. Roughly doubling the number of petajoule electricity generated by solar and wind energy. In addition, the planned expansion of interconnection capacity between the Netherlands and other European Member States leads to an expansion of the supply of electricity from other Member States. For the next decade, interconnection capacity is expected to double from 5.55 gigawatts in 2016 to 10.8 gigawatts in 2025. See more under Chapter 4.

The Coal Prohibition Act, which entered into force in January 2022, does not allow coal-fired operators to use coal in electricity production from 2030 onwards. On the contrary, the contribution of renewable sources is expected to increase sharply in the coming years, in particular due to the growth of renewable electricity production (see paragraph 4.2.2). In addition, the share of nuclear energy in the energy mix will increase over time. This is due both to the lengthening of the current Borssele nuclear power plant and to the necessary steps for the construction of two new nuclear power plants.[142]

As regards increasing flexibility in the system, the market organisation of the electricity market is laid down in the Energy Act in line with European legislation. It gives all final customers access to the market on equal terms and can, for example, react directly to the electricity market situation by means of a dynamic price contract.

Natural gas

The consumption of natural gas will be reduced by the continued reduction in the use of natural gas in (mainly decentralised) electricity production through cogeneration and reduced natural gas demand for heating buildings and by changing the use of natural gas in industry (e.g. electrification, biogas or hydrogen). The Kamerbrief on the security of gas supply of April 2023[143] indicates that, however, the import of Liquid Natural Gas (LNG) in the coming years is still necessary to ensure a proper supply of demand.

[142] the Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1). [143] parliamentary Document 29023, No 417.

[144] parliamentary Document 29023, No 496.

This is also confirmed in the Long Term *Needs Study for LNG in the Netherlands*.[144] Righting 2030 is expected to reduce the need for these import flows, and the existing terminals should then be gradually made ready for large-scale imports of sustainable energy carriers (e.g. hydrogen, ammonia, derivatives).

Furthermore, the legislative proposal to combat energy crisis is currently under preparation. The aim of this bill is, on the one hand, to enable the responsible Minister to intervene effectively and decisively in the event of a gas crisis and, on the other hand, to make the gas system more robust, in order to better ensure security of gas supply. For example, the law gives the power to take mandatory measures in the emergency plan for gas without the need to use the law on state emergency. The legislative proposal is being consulted this spring and is expected to enter into force on 1 January 2026.

Energy storage roadmap

The Energy Storage Roadmap identifies actions to be taken to promote energy storage, appropriate to its expected role in the future energy system, until 2035 and beyond. The Energy Storage Roadmap looks at all forms of energy storage, divided into electricity, molecular and heat storage.

In the energy system of the future, electricity is the main energy carrier, hydrogen plays an important system role, and decentralised sustainable heat supply complements a large part of the heat demand. The majority of energy production in a sustainable energy system comes from variable sources such as wind and solar. The potential differences between supply and demand will therefore be larger than in the former energy system, which mainly consisted of controllable power plants based on coal and gas and natural gas heating. This increases the so-called “flexibility issue”: balancing the energy system requires flexibility, which can be provided in different (often coherent) forms: (1) flexible demand response, (2) (CO2free) controllable power, (3) interconnection (with other countries), also known as transport, (4) conversion and finally (5) energy storage, the subject of this roadmap.

Energy storage has for some time been and will continue to play a crucial role in our energy system. The Energy Storage Roadmap states that both electricity, molecular and heat storage are (will) be needed in our energy system. Firstly, because they bring together supply and demand within the standalone energy chains. For example, electricity storage can increase wind and solar energy generation and heat storage is crucial to tap into the supply of geo- and sunthermia. Second, because electricity, molecular, as heat storage, complement each other very well and necessarily in terms of power and storage duration (system integration or inter-chain exchange). In particular, short-term storage is suitable for various forms of electricity storage, such as batteries, compressed air (CAES) or valleys. Heat storage, for example in buffers or underground, is well suited to storing energy in the medium and long term. Finally, molecular storage, for example in the form of hydrogen and hydrogen derivatives or biofeedstocks (green gas, bioethanol), is well suited to store large amounts of energy in the long term.

In addition to the need to complement each other electricity, molecular and thermal storage, there will also have to be (system) integration in order to make best use of additional conversion techniques, such as Power-to-Heat and Power-to-Gas.

II Regional cooperation in this area

With regard to natural gas, the Pentalaterale Gas Platform cooperates closely with Belgium, Germany, France and Luxembourg at government level. This cooperation shall cover both market forces and security of supply. Transmission system operators and energy regulators are also involved in this context. In addition, there is close cooperation at government level with Belgium, Germany and France on the phasing out of low-calorific gas use in those countries, including transmission system operators and energy regulators.

3.4 internal energy market dimension

I Electricity infrastructure

I Policies and measures to achieve the intended level of interconnectivity referred to in Article 4(d)

The Netherlands largely meets the EU target of 15 % interconnectivity. With an average electricityconsumption of less than 14 gigawatts in 2020, the interconnection capacity was 9.1 gigawatts.145 The Netherlands has interconnection with Belgium, Germany, Denmark, Norway and the United Kingdom. Interconnection capacity continues to grow to 9.8 gigawatts in 2025 and 10.8 gigawatts in 2030.

A higher, generic interconnection target is not considered useful in advance by the Netherlands. The added value of additional interconnection varies across borders. The level of price differences between regions is the main indicator of the expected added value of new investments in interconnection. An alternative to new physical interconnection is to make more efficient use of existing interconnection or to make better cross-border arrangements. In principle, the Netherlands takes a positive view of new interconnectors where the socio-economic and environmental cost-benefit analysis has positive results.

II Regional cooperation in this area

Regional cooperation with neighbouring countries takes place between countries of the Pentalateral Energy Forum. Network operators also cooperate closely within the Regional Coordination Centres (RCCs). Some of the tasks of the national network operators have already been transferred to these RCCs through the EU Clean Energy Package (2019). In planning infrastructure projects (through ten-year development plans), network operators cooperate closely through, inter alia, the European Network of Network Operators (ENTSO-E).

III Where applicable, financing arrangements in this area at national level, including Union support and the use of Union funds.

Infrastructure projects of general interest may, under certain conditions, be eligible for funding from the Connecting Europe Facility (CEF). In addition, the European Investment Bank (EIB) has the European Fund for Strategic Investments (EFSI) available.

II Energy transmission infrastructure

I Policies and measures to achieve the intended level of interconnectivity referred to in Article 4(d)

As described under Chapter 2.4.II, several routes are running to increase grid capacity in the Netherlands. Between 2016 and 2022, the Dutch share of renewable energy grew by a factor of 3. The amount of solar energy increased by 11 times in the same period, while the share of electricity from coal-fired power plants decreased by 70 %. Between 2019 and 2021, 8 % of total energy demand was replaced by solar and wind energy. Together with Australia and Vietnam, the Netherlands experienced the fastest transition to wind and solar energy worldwide. The Netherlands has also been installed in recent years to increase the share of electric transport. All these developments and new policy intentions have an impact on grid capacity. At this point in time, the Netherlands is therefore developing a framework for the allocation of the current grid capacity. The implementation of an action plan to accelerate grid reinforcement was also launched in January 2023. Together with stakeholders such as grid operators, regulators and industrial users of the electricity grid, more than 50 actions have been identified with the aim of (1) accelerating the implementation of the grid reinforcement. (2) by legislating for efficient use of the existing network, and (3) increasing the flexible use of available grid capacity by businesses and industry. Specifically for charging facilities for electric cars, a national agenda has been launched to address possible bottlenecks.

For the connection of offshore wind farms, TenneT uses a concept based on standard platforms, allowing 700 megawatts of wind energy to be connected for near-coastal wind farms per platform. Five of these platforms have now been delivered; there are two to four more. For the connection of the wind farms further

at sea, TenneT operates standard platforms of 2.000 megawatts. The delivery of eight of these platforms is foreseen for the period 2028-2031.

For the purposes of Dutch gas transmission and distribution infrastructure, a new large-scale nitrogen installation has been built to

145Electricity interconnection capacity, 2015-2021 | Compendium for the Environment (clo.nl).
144 Parliamentary Document 29023, No 490.

convert between 5 and 7 billion m^3 high calorific gas into low calorific gas on an annual basis. At the end of March 2018, the government decided to build this additional nitrogen plant so that the end of production from the Groningen field can be mitigated by importing high-calorific gas. The new nitrogen plant has now been put into operation.

The energy transition legislative agenda includes the following laws: The Electricity Act 1998, the Gas Act, the Heat Act, the Offshore Wind Power Act and the Mining Act. The aim of the legislative agenda is to prepare these laws in clear and coherent steps for the transition to a low CO2energy supply that also ensures reliability, affordability and security. The broad lines of the climate and energy agreements are enshrined in the Climate Law.

II Regional cooperation in this area

See Chapter 1.4.

III Where applicable, financing arrangements in this area at national level, including Union support and the use of Union funds.

Not applicable.

III Market integration

I Policies and measures relating to the elements set out in point 2.4.3

The need for more flexibility in the event of a further increase in intermittent sources in the electricity system is recognised. The Netherlands establishes the market organisation with the Energy Act in such a way that flexibility (including for small consumers) can be made even more accessible and small consumers have better access to the market and are rewarded in line with market conditions. Small consumers will have direct access to the market, but may also benefit from new entrants, such as the aggregator, who support them in this process. The roll-out of smart meters has been an important condition for this, see Chapter 2.4.3.i.

Dynamic prices are increasingly entering the retail market. There is already a lot of flexibility in the system such as that of large consumers who are flexible and respond to real-time prices by switching up, up- or downloading and parties with storage assets offering on the different markets.

Independent network management ensures fair competition in supply and wholesale markets and increases the reliability of the systems. Competition between different suppliers in the energy market is good for the degree of affordability.

In addition, the system of "programme responsibility" or balance sheet responsibility regulates that suppliers and customers themselves balance supply and demand in the energy market. They experience an economic incentive to achieve agreed deliveries and purchases. This system, combined with a well-functioning market-based imbalance market, ensures the system balance. This system therefore remains the basis for the Dutch market design. In addition, the Dutch market system does not have regulated price caps (with the exception of the price cap in response to the high prices caused by the war in Ukraine) and the technical price limits for the imbalance market are so high that market participants have the maximum incentive to be in balance. External research acknowledges that the Netherlands has a very functioning electricity market system.

II Measures to make the energy system more flexible with regard to renewable energy production

A number of areas for improvement have been identified in these areas, but in general the obstacles to the measures mentioned here are small. The main measure to make the energy system more flexible is by adapting the regulatory framework in the planned legislative agenda. In addition, systems integration and flexibility are receiving increasing attention and financial support for research (innovation) within the Energy Sector (TSE), including for example in relation to (seasonal storage and conversion).

However, the Netherlands already has the possibility of two meters on a connection, so that several suppliers can offer different services. In addition, there is already a great deal of flexibility in the system, but it is not earmarked as such: large consumers who are flexible already react to real-time prices and offer their assets in the different markets. However, this is not measured separately but is intertwined in the market.

III *Measures to ensure non-discriminatory participation of energy from renewable sources, demand response and storage in all energy markets*

There is no discrimination regarding the participation of energy from renewable sources. Priority access and (re) dispatch of these

[147] parliamentary Document 27879, No 94.

sources is established by law, in line with European obligations.

IV Policies and measures to protect consumers and improve competitiveness and competitive pressure on the energy market

In order to be able to supply small consumers, a supply licence must be applied for. The Authority for Consumers and Markets (ACM) supervises these authorisations. Licensing requirements are regulated, inter alia, in Chapter 8 of the Electricity Act 1998 and the supervision of licensed suppliers was strengthened in autumn 2022.146 In May 2022, the Dutch retail market had 57 suppliers licensed to supply electricity and or gas to small consumers.

Dutch consumers are also protected against disconnection and possible bankruptcy of a supplier. As indicated above, the Netherlands has an authorisation scheme for the supply of small consumers.
If a supplier's licence is withdrawn by, for example, bankruptcy, retail consumers are assured of supply by a supplier or last resort mechanism. The legislation on this subject provides, first of all, for the possibility of selling all or part of the customer base to one or more other licensees before the actual withdrawal of the supply licence. If this is not achieved or only partially achieved, the remaining small consumers who lose their supplier at the time of withdrawal of the supply licence will be distributed among the other licensed suppliers. All suppliers to retail consumers on the market therefore act together as a supplier of last resort. This scheme applies to both electricity and gas. Under the scheme, the national electricity network operators (TenneT) and gas (TSG) have a central and coordinating role. The bankruptcy procedure is clarified in the Energy Act, whose parliamentary examination is scheduled for 2024. In addition, in cooperation with the regulator, the requirements and supervision of energy suppliers have been strengthened so that consumers are supplied by reliable parties. This will also be enshrined in the Energy Act Bill. In addition, the Energy Act bill contains several provisions aimed at strengthening the position and choice of energy consumers, such as the obligation for energy suppliers to offer a model contract with fixed tariffs (at least one year) and the right to a free and independent comparison tool. For example, a proposal is being drawn up by the Minister for Economic Affairs whereby consumers can no longer simply be called for telmarket purposes on the basis of a customer relationship. This would mean that customers should only be called if they have given specific consent to the energy company in question. Legislation is also being prepared by the Minister for Economic Affairs to introduce a mandatory period of reflection in the Netherlands in the event of door-to-door reporting. A consumer will then be given at least three working days the opportunity to reflect on an offer to the door that is, at all times, voluntary.147 Finally, strengthening the position of consumers in the retail market is also one of the main objectives of the EU Electricity Market Design package expected to be published this year. The national implementation of these new EU rules, to the extent that current Dutch rules are not yet in place, will also further strengthen the position of energy consumers.

146Policy rule on the assessment of financial qualities of suppliers of electricity or gas to small consumers, Government Gazette 2022, 26273, and https://www.acm.nl/nl/publicaties/beleidsregel-betrouwbare-levering-van-elektriciteit-gas-en-continuiteit-van-energieleveranciers.

v Description of measures to enable and develop demand response, including measures supporting dynamic pricing

The need for more flexibility, including through demand response, in the event of a further increase in intermittent sources in the electricity system is recognised.
By completing the examination of the Energy Act, the Dutch legislation will be more in line with European legislation. It also formally guarantees the ability of final customers to participate actively in the energy market, as producers, suppliers or through flexibility or energy efficiency services. These include the right to dynamic price contracts and the possibility to participate in DSR agreements.

IV Energy poverty

Monitoring

There is a need for a better understanding of the development of energy poverty at national and local level. Therefore, in order to identify energy poverty in the Netherlands, in addition to (1) income and purchasing power, it looks at (2) the affordability of energy, (3) the energy quality of the dwelling and (4) the possibilities to invest in sustainable housing improvements. In line with the obligation under the revision of the EED, energy poverty includes the following elements: a household's lack of access to affordable essential energy services that underpin a decent standard of living and health, due to a combination of factors, including insufficient disposable income, high energy spending, poor energy quality of housing and low investment opportunities for sustainability. A monitoring system has therefore been developed by the CBS on behalf of the Government in order to better understand energy poverty. In January 2023, the first monitor was issued on the basis of the most up-to-date figures (2020). This shows that 2021 6.4 % of households struggle to pay their energy bills in 2019 (CBS, 2023).

Chapter 4.5.V Energy poverty explains the CBS publication of the Energy Poverty Monitor.

Approach

The Government is working with local and regional authorities to tackle energy poverty. This has been done, inter alia, since 2022 within the 3-year National Energy Poverty Research Programme. This research programme also works towards a common ambition including policy objectives on energy poverty. The aim is to establish this year.

The government is aware of the difficult situation faced by many households due to the increased cost of living. For the 2024 budget, the government opted primarily for a package of targeted purchasing power measures to address broader poverty issues through means-tested allowances and taxes. The temporary generic crisis measures related to high energy prices adopted for 2022 and 2023, such as the price cap and the energy surcharge, have therefore ended. However, the Kingdom of Belgium has again granted a subsidy for the Temporary Emergency Fund. Due to the fact that energy prices are still higher than for 2021, the government decided to make this contribution available again, so that a safety net is available for low- and middle-income households and high energy bills in 2024. Specific measures have also been taken within the purchasing power package to mitigate the impact of high energy bills on households. Following a temporary winter arrangement in 2022, as of 1 April 2023, households are structurally better protected from energy disconnection if they are unable to pay their energy bills in full, provided that they are in contact with the energy supplier and make and honour a payment scheme or are in a (demand-to-) debt relief path.

A strong commitment to energy savings has also contributed to this. For example, through the public campaign "Save the button". In addition, specific measures have been taken to achieve energy savings in the built environment.

Temporary price cap

In 2023, a temporary price cap for retail consumers for gas, electricity and heat was occasionally introduced, as the energy market was in an uncertain situation with high prices and high volatility during that period. In order to provide timely support and certainty to households, the price cap intervened in energy bills. The mechanism with volume limits of 1 200 m^3 gas and 2 900 kilowatt-hour of electricity per household does maintain a full marginal price incentive for a part of households, leaving – albeit more limited – market forces and an incentive to become more sustainable.

TNO's analysis shows that this financial compensation has significantly mitigated the increase in energy poverty. Without this financial support, the number of energy poor households had doubled compared to 2020 to almost one million households in

[147] parliamentary Document 27879, No 94.

2022.148

Acceleration in the local isolation approach

In 2023, the Netherlands will accelerate the deployment of EUR 100 million from the national isolation programme from the Climate Fund to address local insulation of municipalities for structural insulation measures in the owner-occupied dwellings. Funds for the National Installation Programme from later years will be put forward for this purpose. The total amount available in 2023 will thus increase to more than EUR 230 million. Combined with an amount of EUR 75 million in 2024 which will also be used for these plans in the first tranche, the government will, in the short term, increase the reach of local insulation from around 142.000 dwellings to over 200.000 dwellings. This will allow municipalities to apply for more funds in the first tranche of the local approach.

Upscaling of energy fixers and energy fixation teams

In recent years, energy fixers have been on the rise. Over the last winter, many residents have been actively approached and helped them to control energy use and improve housing comfort. By means of energy fixers, the Netherlands refers to all approaches from volunteers to professionals providing energy advice to residents and taking small to medium-sized measures in the dwelling. Often, energy fixers also help households with other questions in the social sphere, for example in the financial field, giving additional support to residents in other areas.

For the upscaling of energy fixation teams, the government will make available EUR 200 million in 2023 to support vulnerable households in rented and owner-occupied housing. These amounts come on top of the EUR 368 million already made available to municipalities in 2021 and 2022 to support energy fixers.149 The Netherlands considers fixed-teams and energy ecoaches important to reduce energy poverty among vulnerable households and reduce the level of energy bills in the short term. The Netherlands is giving a boost to this through additional resources. The approach to energy fixers combined with the isolation programme is an active approach to people and removes practical and administrative concerns about making people more sustainable. Energy fixers are also seen as a first contact with households and are thus valuable in follow-up actions to integrate housing into the energy transition. The Netherlands is making every effort to have as many houses as possible visited for the upcoming heating season. Municipalities play a crucial role in this respect. The proposals will specifically take into account vulnerable households in the 20 focus areas of the National Programme for Ability and Security.

Support tenants in exercising the right of initiative

The Netherlands is focusing on the necessary possibilities to support tenants in exercising their legal right of initiative through support through the municipalities. To this end, municipalities can use resources to tackle energy poverty. Indeed, many municipalities are already focusing on support for tenants. They do so in the context of poverty reduction, sustainability through the deployment of so-called fixation teams, and the deployment of rental teams.

Tackling money, poverty and debt

In addition to the quality of housing, livelihoods are also an important element of energy poverty. In this context, the approach to finance concerns, poverty and Schulden (2022) should also be mentioned. This approach consists of a large number of actions, initiatives and measures in various areas. With concrete targets of halving, compared to 2015, the number of children rising into poverty in 2025 and halving the number of people living in poverty and the number of households with problematic debts in 2030.

Municipalities, among others, also have an important role to play in tackling poverty and debt. The municipality can help low-income earners in different ways. The Social Minimum Commission (hereinafter: the Commission) for the Netherlands submitted its final report “A certain existence II” to the Minister for Poverty Policies, Participation and Pensions on 28 September. With this report, the Commission gives an insight into the system

148TNO (2023) Energy poverty Netherlands 2022, The Hague, TNO.
149Parliamentary paper 32847, No 1014.

of the social minimum, including possible scenarios on how the system can better fit with what different types of households need to live.
The Commission's report shows that structural policy changes are needed to provide longer-term financial security and that a predictable and accessible social security system is very important in this respect. The Commission's final report on the social minimum shows that households are very vulnerable just above the level of assistance, as they have too small financial buffer. The Commission is asking the Netherlands to develop additional policies on housing, care and energy in order to increase the availability of social rental housing and protect low-income households from high energy spending and from the accumulation of healthcare costs.

The government response was sent to the House of Representatives on 10 October.[150] The Netherlands endorses the conclusion of the Social Minimum Committee that achieving livelihood security is of great importance for people and that important steps are still to be taken towards ensuring livelihoods for everyone in the Netherlands. In the letter, the two governors indicate that many recommendations are in line with the plans under way by the Cabinet. For example, in 2024, partly as a result of the Commission's first report, the rent supplement and the child-linked budget were increased structurally. In addition, the government is working on adjustments to the system. For example, the adaptation of the Participation Act, such as a wider upper income threshold for people in the assistance. Certain proposals call for a fundamental consideration and are therefore for a new Cabinet.

[150] parliamentary document 36410-XV, No 21.

3.5 research, innovation and competitiveness dimension

I Policies and measures relating to the elements set out in point 2.5

Research and Innovation

With its innovation policy, the Netherlands is accelerating the process of developing new/improved applications that are necessary to achieve the Dutch climate targets and maintain a reliable, affordable, sustainable, safe and supported energy system. It puts a focus and mass on innovation engagement through *mission-driven innovation policies*: all relevant parties are working towards jointly formulated civil society missions.

This will focus all innovation engagement (public and private) over the long term on the innovations that contribute most to these missions.

This is done (1) with relevant public authorities, businesses and knowledge institutions; (2) throughout the innovation chain from basic research to demonstrations; (3) connecting innovation demand (from business, climate policy) to innovation offer (from companies and knowledge institutions); and (4) from a comprehensive perspective on sectors and cross-cutting issues.

These missions have been formulated in an Integrated Knowledge and Innovation Agenda Climate and Energy (IKIA) with a broad stakeholder field of knowledge institutions, businesses and civil society organisations and developed into Multi-annual Mission-driven Innovation Programmes (MMIPs; see also Chapter 2.5 for the mission objectives and MMIPs on Climate and Energy).

Through policy measures, we address these missions:

- *market failure* (no private underinvestment innovation through external and spillover effects)
  — through 'money' (risk reduction through partial public funding and research);
- *system failures* (deadlock of innovations due to network failures and knowledge sharing)
  - through "community" (cooperation between businesses and knowledge institutions);
- *transition* failure (innovation does not contribute to societal challenges)
  — through "guide" (joint public-private mission-driven programming).

Market failures are addressed by a wide range of financial instruments across the innovation chain, as specified under heading III. Medium criteria will also promote knowledge dissemination, public-private cooperation (prevention of system failure) and alignment with the MMIPs (avoiding transition failures).

System failures are promoted through collaborative criteria in the innovation schemes under heading III; but also through the Dutch mission driven top sector and innovation policy. Stimulate the Dutch top sectors in specific sectors of public-private innovation cooperation and knowledge dissemination; and to do so, work towards networking.

From these networks, they also advise the relevant ministry on the programming of activities and the deployment of (innovation) policies. For climate and energy, the Energy and Chemistry Top sectors play a major role.

Transition failures are addressed by a public-private programming and monitoring cycle of the jointly established mission targets. This involves both public authorities and businesses (with specific knowledge questions and innovation needs) with knowledge institutions and entrepreneurs (with specific innovation and knowledge offers).

The increased ambitions of this government for 2030, 2035 and 2040 have led to a number of adjustments compared to the previous INEK:

- The recalibration of IKIA 2019-2023 'and MMIPs together with industry, knowledge institutions and public authorities took place in 2023 and resulted in a new IKIA Climate Action for MMIPs for the period 2024-2027. In doing so, we are defining a wide range of innovation efforts needed for the 2022 Coalition Agreement.
- The Climate Fund has increased its commitment to scaling up technologies related to the production of renewable energy carriers. This has led to several measures included in the Multiannual Climate Fund Programme 2024 and 2025. (lot of early stage upscaling)
- The possibilities offered by permitting procedures for offshore wind farms to foster innovation, for example for better system integration, reducing negative environmental impacts and increasing energy yields through the deployment of solar farms in offshore wind farms.

Digitisation

Digitalisation is an important prerequisite for the design of the energy system. Digital systems are needed, for example, to properly match electricity supply and demand and, where possible, to do so on a local scale or to gain a better understanding of the functioning of the energy system. As described in the NPE, a vision of digitalisation in the energy system is being developed to identify the opportunities and risks of this digitalisation. These risks, for example, relate to privacy, cybersecurity and the prevention of vendor lock.

For the climate and energy innovation effort, a digitalisation programme is already in placewith a focus on the following components:

1. Mission-driven Digitalisation
   Innovate with digital and information technologies to accelerate the energy transition within the sectors:
   a. Electricity system
   b. Built Environment
   c. Industry
   d. System integration

2. Digital success factors
   Reflecting on digitalisation for an open, fair and democratically governed energy system, through the development of
   a. Reference Architecture
   b. Data governance
   c. Cybersecurity
   d. Digital skills responsible for human capital

Human Capital

For labour market policies in the field of energy transition, Chapter 2.II already outlines the Green and Digital Jobs Action Plan. Innovation contributes to the objectives of that action plan; by taking human capital aspects into account in innovation efforts and developing the right overarching labour innovations. The Energy SectorHYPERLINK "https://topsectorenergie.nl/nl/maak-kennis-met-tse/human-capital-agenda/" Human Capital Agenda helps remove bottlenecks in the labour market in the transition to a sustainable energy system. The programme contributes to this by investing in the skills of professionals dealing with change and acquiring new skills. This is done through a number of programme lines:

- Coherent approach to labour innovations
- Labour-saving innovations
- Innovative learning and working on the energy transition
- Future labour market

Competitiveness

The Netherlands considers investment in RD FD to be an important means of achieving innovations, productivity and solutions to societal challenges through the development and absorption of knowledge and technology. These societal challenges are characterised by sustainable future growth markets, with R &D. having strong spill-over effects on the economies of the Netherlands in response to these challenges.

Competitiveness (innovation) policies are therefore inherently intertwined with (innovation) policies around societal challenges. Through the MMIPs, public and private engagement will focus on the earning opportunities of societal challenges. This includes the increasing level of co-financing as innovation comes closer to the market. This encourages valorisation of innovations with a strong business model.

In addition to technological development, the development of component manufacturing and supply chains are important for competitiveness; in line with these future markets. The Netherlands is looking at ways to facilitate this. The European Commission has published a proposal through the Green Deal Industrial Plan to accelerate the uptake of European manufacturing for green technologies through accelerated permitting: the Net Zero Industry Act (NZIA). The NZIA includes a number of technologies as strategic. These strategic technologies are final products, components or production equipment of, inter alia, electrolysers, solar PV, batteries, wind energy, heat pumps and CCS. These growth markets are in line with related policy frameworks, such as the National Growth Fund and the perspective of the Dutch economy.

In addition to the NZIA, the Green Deal Industrial Plan included amendments to the State aid frameworks, specifically the

Temporary Crisis and Transition Framework (TCTF) and the extension of the General Block Exemption Regulation (GBER). Both extensions give Member States more scope to stimulate the production of clean technologies. On 3 March, a market consultation was completed for a new subsidy for the manufacturing industry in hydrogen, batteries and solar panels: production lines and industrial sites. The aim is to publish the scheme in Q2 2024. This depends on the notification path to be launched to the European Commission in March 2024.

In addition, R &Dis strongly rooted in regional cooperation and is strongly linked to regional innovation clusters and local economic sectors. Therefore, national innovation policies are seen in strong coherence with regional engagement and instruments. The provinces and Regional Development Companies (ROMs) are therefore explicitly part of the programming and monitoring cycle around the innovation engagement.

As indicated, one of the biggest changes compared to the previous INEK is the commitment of the National Growth Fund to promote structural economic growth. It also highlights innovation programmes relevant for climate and energy. There have now been three rounds of submission of the National Growth Fund out of the five rounds foreseen.151 The results of the first three rounds are known. The National Growth Fund has been set up to strengthen the competitiveness of the Netherlands. In doing so, the primary objective is economic, but this is closely linked to the societal transitions taking place in the coming decades. In the two completed rounds, EUR 876 million were mobilised for research, knowledge development and scaling up in renewable hydrogen production and use. EUR 200 million has also been made available for research and innovation in heat infrastructure. Mobilising these public funds will also strengthen private funding on the themes. It is expected that between 1,5 and 2 times more private investment will be mobilised in this way.

In the third round, several proposals in the field of energy and sustainability were awarded grants. The SolarNL proposal, aimed at developing a manufacturing industry of innovative and integrated solar panels, was awarded 412 million of which 100 million loan. The Material Independence, Circular Batteries proposal, has been awarded 297 million and aims at developing a manufacturing industry of innovative batteries with sustainability and circularity at its core. The biobased Circular proposal has received 338 million grant and aims at creating and demonstrating closed circular value chains in the Netherlands for plastic products (polymers) based on carbohydrate-rich bioraw materials.

II Cooperation with other Member States in this area, including information on how SET Plan policies and objectives are translated in a national context

For energy innovation, it is important, especially for a relatively small country such as the Netherlands, to be well connected to the international playing field. This strengthens the knowledge base, leads to economies of scale, accelerates the innovation process and provides economic opportunities. In addition, it may be attractive to apply innovations developed abroad first and operate as testbeds. International (strengthened) cooperation on a number of strategically selected topics will enable the Netherlands to achieve climate and energy ambitions cost-effectively, strengthen the knowledge base and competitiveness and position the Netherlands in a highly globalised energy market. This international cooperation is based on the Climate Agreement, the related Integrated Knowledge and Innovation Agenda for Climate and Energy and the 14 Multi-annual Mission-driven Innovation Programmes.

At international level, the Netherlands is working together on energy innovation through the European Strategic Energy Technology (SET) Plan, Horizon Europe, the International Energy Agency, Mission Innovation and the Clean Energy Ministerial. In doing so, climate and energy innovation policies contribute to the missions and objectives of the National Climate Agreement and to the EU level energy and climate targets.

Cooperation with European Member States

The Netherlands actively participates in the SET-Plan Steering Group and several Implementation Working Groups (IWGs). The IWGs provide a forum to exchange knowledge and experience between Member States. Relevant knowledge, such as geothermal knowledge, is used in national context. The Netherlands does not have a separate subsidy pot for the SET Plan or other international groupings. National subsidy schemes can be used for this purpose, provided that the activities benefit the Dutch economy or other Dutch interests. In addition, Union funds can be used at European level.

Other international cooperation

151The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).

Mission Innovation

Mission Innovation (MI) is an international collaboration of 25 countries and the European Commission with the aim of accelerating clean energy innovation. MI was launched in 2015 and margins of the Paris Climate Conference. The content of the deployment is shaped within Missions. Knowledge sharing and R &Dtake place within a mission with other participating MI Member States and the private sector. Participating countries are free to decide which Missions they participate in.

In 2022, the *Mission on Integrated Biorefineries* was launched, at the initiative of the Netherlands and India. The objective is to develop and demonstrate innovative solutions to accelerate the commercialisation of integrated biorefineries, with the aim of replacing 2030 10 % of fossil fuels, chemicals and materials with bio-based alternatives by 2020 (compared to 2020). The Netherlands opted for co-leadership of this Mission because the Netherlands has strong agricultural, industrial and logistics sectors. Biorefinery solutions are hard needed to meet the climate targets. These innovations will reduce CO2emissions in the transport and chemical sectors. Globally, these sectors now emit roughly one third of all CO2. In addition to the Netherlands, India (co-lead), Brazil, Canada, United Kingdom and the European Commission participate.

Clean Energy Ministerial

The Clean Energy Ministerial (CEM) is a group of 29 countries that aims to stimulate the deployment of existing clean energy technologies. This is done through initiatives involving both public and private parties. These initiatives are open to both members and non-members. Countries can propose initiatives based on their own national priorities. This pragmatic approach allows the Netherlands to focus selectively on policy-relevant areas where we benefit from international exchanges and where Dutch parties can position themselves internationally. The Netherlands is co-lead of the Hydrogen Initiative and the Biofuture Initiative.

International Energy Agency

The Netherlands operates within the IEA and the technology network and participates in about half of the Technology Collaboration Programmes (TCPs) (18 out of 38). A TCP supports the work of an independent international group of experts, who in turn help governments and businesses to lead programmes and projects in the field of energy technologies and related topics. Through this cooperation, these experts shall work to promote research, development and the commercialisation of energy technologies. The Netherlands is a member of the following TCPs: Energy Technology Systems Analyses (ETSAP), Buildings and Communities (EBC), Energy Efficient End-use Equipment (4E), Energy Storage (ES), Heat Pumping Technologies (HTP), user-rolled Energy Systems (Users TCP), Smart Grids (ISGAN), Industrial Technologies and Systems (IETS), Hybrid and Electric Vehicles (HEV), Bioenergy (BIO), Hydrogen (HIA), Ocean Energy Systems (OES), Photovoltaic Power Systems (PVPS), Solar Heating and Cooling (SHC), Wind Energy Systems (Wind), International Energy Agency Greenhouse Gas R & ampD Programme (IEAGHG), District Heating Cooling (DHC), Decarbonisation of Cities and Communities (Cities).

III Financing arrangements in this area at national level, including Union support and the use of Union funds

See also Chapter 3.1.I.i for an overview of the Grant Operations.

Dedicated climate and energy financing instruments

Dutch Science Organisation (NWO including NWA and KIC)

We fund projects or programmes for thematic research and valorisation, in cooperation with external public and/or private parties. These projects or programmes are designed to increase and accelerate the economic or societal impact of research. Consider programmes of the National Science Agenda, programmes within the framework of the Knowledge and Innovation Alliance (focusing on major challenges in our society, which require more knowledge and breakthrough innovations), and programmes funded by the National Growth Fund, large-scale investment projects and programmes focusing on longer-term economic growth).

TNO

TNO works on various demand-driven programmes with the annual budget commissioned by K, with demand-driven programmes (VPs) focusing on a medium-term application, with Technological Readiness Level (TRL) 4-6, and the research objectives per theme are coordinated annually with government (for the societal themes) and companies (top sectors). Research programmes in relation to K – E include the development of innovations in wind and solar energy, sustainable construction, climate-neutral industry and system transitions.

Innovation schemes

- Budget appropriations (EUR 7 million/yr)
  Resources procured within one year to small studies or innovations. Consists of budget for the DSTs, small assignments of TABs, (international) conferences and reserve.
- Grant tenders (EUR 6 million/yr)
  Resources for public-private research pathways and innovation pathways. Concerns regulations published in the Government Gazette where several proposals are in competition with each other. In many cases, several proposals can be accepted.
- TSE Industry Studies (EUR 8 million/yr)
  Means for feasibility and environmental studies for pilot and demonstration projects in industry.
- MODI scheme (EUR 63 mln/2jr)
  Scheme for large integrated partnerships combining multiple stages of innovation, technical, economic, legal and/or social innovations. The scheme will be opened every two years.
  Several proposals will be accepted.
- In addition, the TSE has a PPP surcharge (EUR 16 million/year). TABs receive a subsidy on the public-private partnerships (PPSs) that they have carried out in the previous year.
- SME Innovation Incentive Region and Top Sectors (MIT)
  This scheme stimulates innovation projects in SMEs across regional borders in line with the innovation agendas of the top sectors. For this purpose, the MIT offers several tools that an entrepreneur can apply for: knowledge vouchers (EUR 2 million), feasibility projects (not in 2023), R footwear cooperation projects (EUR 3.1 million), networking activities and innovation brokers (EUR 2.2 million).

Energy Innovation Demonstration Scheme

- Dei + arrangement
  Generic scheme for pilots and demos focusing on CCU (pilots), CCS (pilots), circular economy (> EUR 3 million), energy efficiency, renewable energy, flexibility of the energy system (pilots), local infrastructure and CO2reduction measures.
- Dei + non-natural dwellings, neighbourhoods, residential buildings and non-residential buildings (± EUR 9 million/yr)
  Pilot and demos scheme that help to decarbonise homes, neighbourhoods, residential buildings and non-residential buildings.
- Dei + Hydrogen and green chemistry (Agri-power NL) (± EUR 40 million)
  Hydrogen pilot and demos scheme. For example for hydrogen production, transport and storage or innovative use of hydrogen and sustainably generated electrons.
- Dei + Circular Economy
  Scheme for pilots and demos (EUR 3 million) for the recycling of waste, reuse of products or components, or pilot projects for biobased raw materials; contributing to less CO_2 in the Netherlands.
- Dei + Dasification of residual flows (Climate Fund Vroege Phase Upgrading (EUR 100 million)
  The climate fund lot ‘early scale-up’ aims at the technologies for the production of

  scaling up renewable high quality energy carriers. One of the measures is to extract biogenic and non-biogenic residual streams and then produce green gas, biofuels or biobased/circular raw materials. This scheme supports demonstration projects to scale up gasification of residual streams.

Important Projects of Common European Interest (IPCEI)

- An Important Project of Common European Interest (IPCEI) is an integrated European project composed of multiple national projects of companies and/or research institutions from different EU Member States that are complementary, synergistic and contribute to sustainability, digitalisation, sovereignty and a level playing field for businesses. Currently, the Netherlands participates in one IPCEI relevant to the sustainability of industry: the IPCEI hydrogen. This consists of:
  - Technology (wave 1 Hy2Tech);
  - Hydrogen production by electrolysis (wave 2 Hy2Use);
  - Import and storage (wave 3 RHATL); and
  - Hydrogen applications in mobility and transport (wave 4 Mobility and Transport).

The following amounts have been made available for this purpose: EUR 35 million for wave 1, EUR 783.5 million for wave 2, EUR 600 million for wave 3 and expected 200 million for wave 4.

National Growth Fund (NGF)

Currently, successful proposals are ongoing on the following topics that touch on sustainability:

- Circular Zonnepanels: This project focuses on the development and industrialisation of new zon-PV technologies and ensures the development of the next generation of fully circular solar panels. The National Growth Fund will invest up to EUR

412 million in the project. Of this amount, EUR 135 million was definitively granted and EUR 177 million was granted on a conditional basis. In addition, EUR 100 million was served for a possible loan for one of the consortium participants.

- Circular Batteries: The project aims to create a strong position for the Dutch manufacturing industry in the global battery chain, with sustainability and circularity at its core. The National Growth Fund will invest up to EUR 296 million in the project. Of this amount, EUR 118 million was granted conditionally and EUR 178 million as a reservation.
- Greenhouse-gasNL and Greenhouse Capital II: Green power NL helps meet the climate challenge by scaling up the innovative ecosystem around green hydrogen and green chemistry. GroenpowerNL is accelerating the creation of an ecosystem for green hydrogen and green chemistry in the Netherlands. This project has received EUR 250 million from the National Growth Fund in 2022. In addition, EUR 250 million has been granted on a conditional basis, making it possible to unlock EUR 1 250 million in investments. With the payment of GreenassNL from the 1th round of the National Growth Fund, EUR 838 million has now been made available from the National Growth Fund for the total GreeceNL programme.
- Circular Plastics: This project aims to boost plastics recycling at national level by removing current bottlenecks in material design, waste sorting, mechanical and chemical recycling and scaling up. This project has received EUR 220 million from the National Growth Fund in 2022. Of this, EUR 124 million has been converted into a final award, and an amount of EUR 96 million remains conditional.
- New Heat No!: Accelerates the construction of sustainable collective heating systems at low social cost. This project has received EUR 200 million from the National Growth Fund in 2022.
- Future-proof Environment: The aim of this proposal is to create a well-functioning, self-reinforcing innovation ecosystem that allows parties to innovate with each other and produces a continuous flow of new (distant) technologies, products, services and procurement in the design, construction and engineering sectors. The investment programme has a total volume of approximately EUR 800 million. In 2022, it was decided to earmark EUR 100 million for this project. In February 2023, the Advisory Committee recommended that this reservation be converted into an allocation of EUR 60 million and a conditional grant of EUR 40 million.

Generic financial instruments

Dutch Science Organisation (NWO)

- Open Competition
  We fund free and untied research in four fields of science. We give researchers the opportunity to carry out research on a topic of their own choice, without any thematic framework conditions.
- Talent
  We facilitate personalised funding for individual researchers at the different stages of their career, whether in a team or otherwise. We fund free and untied research, including through the Talent programme (Veni, Vidi, Vici), tailored to the different stages of researchers' careers.[152] [153]
- Practice-oriented research
  We are investing in professionalisation, quality enhancement and self-organisation of the field oriented research of colleges. To this end, we use different funding instruments, under the responsibility of our Regieorgaan SIA.
- Scientific infrastructure
  We contribute to the realisation and connectivity of (large-scale) scientific infrastructure through, inter alia, the National Roadmap for Large Scale Scientific Infrastructure. Financial support for further building up the Dutch digital research and data infrastructure, for example for eScience and computing facilities, and fostering coordination and cooperation through Thematic Digital Competence Centers (TDCCs).

National Growth Fund (NGF)

The National Growth Fund invests in projects that make the greatest possible contribution to sustainable and structural economic growth. These investments are focused on "Knowledge Development" and "Research, Development and Innovation". (For accepted proposals in the field of Climate and Energy: see sub-heading specific financial instruments).

Innovation Credit

The Innovation Credit is intended for the development of innovative development projects with high technical risks and an excellent market perspective. In 2023, there are EUR 30 million for technical development projects and EUR 30 million for clinical development projects.

152 NWO Veni | Vidi | Vici Talent Programme.
153 Rubicon.

Seed Business Angel Regeling
Scheme to finance a technical or creative start-up with other investors. A loan of up to EUR 1 million can be requested to set up a fund.

Early funding phase (VFF)
Loan for SMEs and start-ups for feasibility studies.

Innovation Box
A special rate box within corporate income tax. The profit included in this tariff box is taxed at a rate of 7 % instead of 25 %.

Scheme S – O remittance reduction (WBSO)
Regulation within the framework of the WVA (Law on the reduction of payroll tax and social security contributions). The remittance reduction S'O is based on the wage costs of R & D workers and on other costs and expenditure on R & D services.

Small Business Innovation Research Programme (SBIR)
SBIR is a method by which public authorities can, through a flexible procurement methodology, challenge economic operators to solve concrete societal problems with innovative products and services.

Corporate finance guarantee (JU)
- 0 % State guarantee on medium and large loans.

InvestNL
Investment Fund for Business Development and Funding on Focus Themes, where private financing is not possible. Invest-NL provides up to 50 % of the risk capital and in principle invests between EUR 5 million – EUR 50 million. The total demand for funding, including other funders, exceeds EUR 10 million.

Regional Development Companies (ROs)
ROMs are organisations that promote sustainable growth in the regional economy and employment. They do this by stimulating innovation; invest in fast-growing companies and attract foreign companies.

Section B
Analytical basis

4 current situation and projections with defined policies

This chapter describes developments in the Netherlands with regard to the five European energy dimensions based on the established policies as of 1 May 2022. The expected developments are based on the National Climate and Energy Outlook (KEV) of the Environmental Planning Bureau (PBL) of 2022 (PBL, 2022a). The reference 'KEV2022' is used below. New statistics and insights have been incorporated into the text where possible and include an indication of the source.

This chapter discusses developments on the basis of the KEV2022 with the adopted policy only.154
The final update of the INEK plan 2021-2030 also uses the KEV2022 for the projections with defined policies, as the 2023 KEV does not contain a separate policy variant with defined policy alone. The 2019 INUK plan included the projections according to the 2019 Climate and Energy Outlook (PBL, 2019a). The main differences with the KEV2022 projections are explained in Box 4.1.

The effects of the planned and planned policy as known on 1 May 2 023 are discussed in Chapter 5 on the basis of the KEV2023, to the extent that a quantitative impact estimate was possible. Detailed figures and parameters based on the KEV2022 can be found in Annexes 4 and 5.155

The KEV2022 describes both the achievements (from 2000) and the expected developments up to and including 2030 (including a look at 2040). The projections used relevant information available on 1 May 2022, such as expectations on economic and sectoral developments, technological developments, energy and CO2prices and policies (see also paragraph 4.1). In general, these figures refer to the year 2020 and, where possible, 2021. More recent information has been incorporated into texts and figures where possible, but could not be used in the projections. These include, for example, new (preliminary) energy and emissions statistics, recent economic developments and energy and CO2prices. Unless otherwise indicated, figures relating to outputs from the Central Statistical Office (CBS).

The KEV2022 reflects the most plausible developments in energy and greenhouse gas emissions up to 2030. However, the developments outlined include inherent uncertainties, for example around the evolution of prices of energy carriers and CO2allowances, uncertainties about the impact of policies and interaction with foreign energy markets. Ranges reflecting these uncertainties are therefore given around the main results. Moreover, emissions from the electricity sector are no longer centrally projected, but only a bandwidth (irrespective of the range mentioned above). This range reflects the (large) uncertainties about production patterns within the North-West European electricity market to which the Netherlands is part.

The KEV2022 provides a review for the period from 2030 to 2040, based on a continuation of the policy adopted and planned as of 1 May 2022. This should be seen as a look at, as uncertainties after 2 030 are significant, partly due to the fact that policies are generally formulated until 2030. The study 'Greenhouse gas emissions reference scenario 2040-2050 for the purpose of the 2050 INEV reporting' (TNO, 2023a) was used to also reflect developments in the period 2023 to 2040. In this study, input parameters and project results from the KEV2022 (until 2040) were used for modelling greenhouse gas emissions and energy consumption in the post-2040 period.

Text box 4.1 Main differences between projections in the 2019 INEK and the present update

The projections in chapter 4 of the INEK from 2019 with defined policies were based on the KEV2019 with 'established policies'. An important difference from the KEV2022 is that most of the policies set out in the 2019 National Climate Agreement have now been taken into account as adopted or planned policies. As far as sufficiently concrete, the Rutte IV

Table 1 of Annex 2154 provides a complete overview of which policy measures have been taken into account in the projection with adopted policies.

155Detailed project results are included for the variants with defined policies ("WEM") and with defined and planned policies ("WAM") according to the KEV2022. This information was not available on the basis of the KEV2023.
After quality checks, some figures in Annex 5 have been adjusted compared to Annex 5 of the draft 2023 INEK update.

Cabinet's planned and stated policy measures have also been taken into account. In addition, due to geopolitical tensions, the CO2and energy prices used are significantly higher than in the KEV2019. Another difference to the KEV2019 is that KEV2022 uses the Global Warming Potentials (GWPs) according to the IPCC's 5th Assessment Report[instead] of the 4th Assessment Report.

Agreements from the 2022 Coalition Agreement, the Climate Policy Programme 2022 and the proposals from the European Commission's "Fit-for-55 package" could only be taken into account to a limited extent in the KEV2022 projections with defined policies alone. The legislative proposals contained in the Fit-for-55 package were considered to be on the agenda in most cases. In some cases, the legislative proposals were sufficiently concrete to be taken into account as intended policy in the projections. These include the revision of the LULUCF regulation, adaptation of ETS conditions for aviation, strengthening of CO2 emissionstandards for passenger cars and vans, revision of the alternative fuels infrastructure regulation and the ReFuelEU Aviation Regulation. Although the revision of the ETS Directive has been considered as an agenda policy, the revision nevertheless results in higher CO2 prices in adopted and planned policies, as market participants are already partially anticipating them.

In the KEV2019, an emission of 2030 [136-145] megaton CO 159 eq was expected for2with adopted policies alone. With planned policies, an emission of 144 [135-159] megaton CO2 eqwas expected. In the KEV2022, both variants expect an emission of 113-138 megaton CO2eq. (based on GWPs according to the 4e Assessment Report). This difference is mainly due to lower emissions in the electricity and industry sectors. The closure of coal-fired power plants in (at the latest) 2030, higher CO2and energy prices and the CO2levy for industry contribute significantly. The differences between the policy variants with adopted and envisaged policies in the KEV are discussed in Chapter 5.

4.1 Factors affecting energy management and greenhouse gas emissions

This section describes the factors relevant to the expected evolution of energy regulation and greenhouse gas emissions, such as economic developments and energy prices. This is based, as far as possible, on the figures and insights assumed in the KEV2022 (PBL, 2022a) and the reference scenario greenhouse gas emissions 2040-2050 (TNO, 2023a). However, some statistics on population, economy and energy prices have been updated in the current texts.

I Macroeconomic developments

Demographic and economic developments have a major impact on energy consumption. This section discusses the main developments in the Netherlands.

Population and number of households is growing

At the end of 2023, the population was 17.9 million people (CBS, 2024a). The population is expected to increase to 18.5 million in 2030 and continues to grow to 19.2 million in 2040 (see Table 4.1). The ageing population has stabilised the potential labour force in recent years. With the increase in the retirement age, the potential labour force will increase in the coming years, but slowly decline after 2030. For consumers' energy consumption, the number of households is more important than the size of the population. Larger households have economies of scale compared to smaller ones, which means that they consume less energy per capita. The average size of a household has been declining for decades and this trend continues in the future. The growth of the number of households is therefore higher than the growth of the population.

Table 4.1 Demographic developments in KEV2022 (source: PBL, 2022a)

	2000	2005	2010	2015	2020	2021	2025	2030	2040
Population (million)	15,9	16,3	16,6	16,9	17,4	17,5	18,0	18,5	19,2
Potential labour force[1] (million)	10,8	11,0	11,1	11,1	11,6	11,6	11,9	12,0	11,9
Private households (million)	6,8	7,1	7,4	7,7	8,0	8,0	8,4	8,7	9,0
WV single person households (million)	2,3	2,4	2,7	2,9	3,1	3,1	3,3	3,5	3,7
Average household size	2,3	2,3	2,2	2,2	2,1	2,1	2,1	2,1	2,1

[1] the potential labour force consists of all persons aged between 15 and the AOW age.

Economic recovery from the coronavirus crisis continues

The value of GDP exceeded for the first time EUR 2 023 trillion in 1 (CBS, 2024b). Compared to 2022, the economy grew by 0.1 % (adjusted for price changes). This was much less than in 2021 and 2022, when the economy recovered sharply from the coronavirus pandemic with growth of 6,2 and 4.3 % respectively in 2020. Two consecutive years with these growth rates had not yet occurred this century. The modest growth in 2023 was accompanied by high inflation and higher interest rates. Furthermore, the volume of world trade was lower than in 2022. In the KEV2022, GDP growth (in 2021 prices) is 2.2 % per year on average from 2 020 to 2030 (see Table 4.2).

Longer term economic growth constrained by ageing

In the longer term, KEV2022expects an ageing population to slow down labour supply and thus potential economic growth (CPB, 2022a). Population growth between the ages of 15 and 75 is slowing down further in the coming years. Employment rates are increasing further in most age groups, but less rapidly than in recent years. In addition, the population of workable ages becomes older, reducing the average employment rate. As a result, average GDP growth moderates to 1.4 % per year in the period 2 030-2040.

Exports continue to make an important contribution to economic growth, alongside investment and household consumption. Growth in government consumption is expected to be lower than economic growth from 2040 onwards.

Table 4.2 Macroeconomic developments in the KEV2022 (index 2021 = 100) (source PBL, 2022a)

	2000	2005	2010	2015	2020[1]	2021[1]	2025	2030	2040
Economic growth (Gross Domestic Product growth)	76,1	81,3	87,1	90,4	95,4	100,0	109,3	116,0	129,2
Household consumption	91,4	95,8	96,6	96,9	96,5	100,0	110,0	117,4	129,1
General government consumption	64,3	72,6	88,4	87,5	95,0	100,0	109,5	119,7	125,1
Fixed capital formation of enterprises	76,6	75,7	76,9	93,6	96,9	100,0	116,5	123,7	141,2
Exports of goods and services	50,4	60,0	69,0	86,2	95,0	100,0	116,0	130,6	167,8
Imports of goods and services	51,5	60,6	69,9	89,7	96,1	100,0	119,2	136,2	173,9

[1] *provisional data.*

II Sectoral developments

In particular, sectoral development determines energy consumption

This section focuses on sectoral developments, as expected in the KEV2022. Broadly speaking, activities in the services sector require much less energy than industrial or agricultural activities. However, there may also be significant differences within the sectors. For example, the basic industry within industry and glasshouse horticulture within agriculture are relatively energy-intensive.

Services sector dominant in the economy

More than three quarters of GDP are currently achieved in the services sector (see Table 4.3). The share of the services sector has increased in recent decades and, despite a decline in growth rates, is likely to increase further in the future. Commercial services are primarily responsible for growth. Cuts in both care, education and public administration lead to lower average growth in these semi-public sectors. Industry has been the first to benefit from the post-crisis recovery of the economy. As a result, its share in the Dutch economy initially increased slightly. The industrial share of GDP is expected to decline again after 2020.

Table 4.3 Share of gross value added by sector[1] in KEV2022 (%) (source: PBL, 2022a)

	2000	2005	2010	2015	2020	2021[2]	2025	2030	2040
Energy companies[3]	0,9	1,2	1,2	1,3	1,4	1,4	1,3	1,3	1,2
Industry (including oil industry) and mining and quarrying	15,9	15,7	14,8	14,0	13,4	13,5	12,3	12,1	11,8
Construction, environmental services and water supply	6,2	5,8	5,2	4,9	5,9	5,7	5,6	5,3	4,7
Trade, transport and business services	53,8	53,2	54,0	55,5	55,8	56,2	56,5	56,8	58,4
Government, education, care, culture and recreation	21,2	22,3	22,9	22,3	21,6	21,4	22,6	23,0	22,3
Agriculture, forestry and fishing	1,9	1,9	1,9	1,9	1,9	1,9	1,7	1,7	1,6

[1] *breakdown by sector according to the main activity of a business on the basis of the CBS Standard Business Classification.*
[2] *provisional data.*
[3] *electricity and heat producers, network companies.*

Energy consumption mainly influenced by production

Energy consumption is not so much value-added, but above all physical production.

This section looks at the value of production expressed in euro (see Table 4.4). Services' share of output is lower than the services sector's share of value added or employment. In 2021, services accounted for around 65 % of production (in euro). On the contrary, industry, which uses relatively many materials and semi-finished products, has a higher share (in euros) of production than in value added or employment. The production share (in euros) of the industry was around 22 % in 2021 and is expected to remain roughly the same in the period thereafter.

Table 4.4 Share of production by sector[1] in the KEV2022 (%) (source: PBL, 2022a)

	2000	2005	2010	2015	2020	2021[2]	2025	2030	2040
Energy companies[3]	1,3	1,5	1,5	1,3	1,3	1,3	1,2	1,2	1,1

Industry (including oil industry) and mining and quarrying	25,2	24,7	23,7	24,1	22,3	22,1	21,3	21,7		21,8
Construction, environmental services and water supply	8,7	8,3	7,7	7,1	8,4	8,3	8,3	7,8		7,1
Trade, transport and business services	47,6	47,4	48,0	49,5	50,5	50,8	51,0	50,9		52,0
Government, education, care, culture and recreation	14,7	15,8	16,8	15,7	15,3	15,4	16,2	16,4		16,0
Agriculture, forestry and fishing	2,4	2,3	2,4	2,3	2,2	2,1	2,0	2,0		1,9

[1] *breakdown by sector according to the main activity of a business on the basis of the CBS Standard Business Classification.*
[2] *provisional data.*
[3] *electricity and heat producers, network companies.*

III Global energy trends, international fossil fuel prices, ETS carbon price

This section discusses the price developments of energy carriers as assumed in the KEV2022, which are fully or substantially imported into international markets by the Netherlands. The development of the price of allowances in the European ETS is also discussed. These prices are important exogenous parameters for the projections of energy consumption, energy mix and greenhouse gas emissions.

Recent developments in energy markets

Demand for fossil fuels has increased sharply again in the course of 2021 compared to previous years (CBS, PBL, RIVM and WUR, 2024). Russia's invasion of Ukraine has led to an unprecedented further increase in energy prices, bringing fuel prices to historically high levels in 2022.

After a sharp fall in world oil prices to just under USD 27 per barrel around April 2020, the price had already recovered to USD 2020 per barrel at the end of 50 (CBS, 2024c). In 2021 prices increased further, peaking at USD 80 per barrel in November. In 2022, prices continued to rise to a peak of USD 116 per barrel in June, also due to the recovery of the economy in almost the world. Natural gas prices were relatively stable between 2010 and the first half of 2021, of around EUR 20 cents per m^3. Prices rose at the end of 2021 and much more in 2022, notably due to the outbreak of the war and all consequences for security of supply and dependence on Russia. In 2022 and 2023, the annual average was EUR 86 and EUR 52 cents per m^3 respectively. Coal prices have been on a declining trend until 2017, but increased significantly until the end of 2018. The average annual price in 2018 was EUR 88 per tonne. It then fell back to the second half of 2021, after which it doubled in the second half of the year due to high prices from other energy carriers. At the end of 2022, the price of coal exceeded EUR 300 per tonne for several months.

Future evolution of prices of energy carriers

Developments in the fuel and CO2emission markets play a major role in the functioning of the energy system. Future price developments in these markets are inherently uncertain and sensitive to unexpected events, as also illustrated by the impact on fuel prices of the Russian invasion of Ukraine in February 2022. Uncertainty will also be heightened in the longer term by the war in Ukraine.

One way to deal with these uncertainties is by using different price scenarios.
By contrast, the alternative price scenarios for the KEV2022 are not necessarily less likely than the fully absorbed central price scenario. Therefore, in addition to the central scenario through which the KEV is fully translated, two alternative price scenarios for oil, coal, gas and CO2 have been used this year: a price path with higher and one with lower prices. With these alternative price scenarios, electricity prices have also been calculated for all current years of the KEV, and the different prices for 2030 have been used in the uncertainty analyses of all sectors.

Fuel prices in the projections of the KEV2022 in Table 4.5 are based on an opinion of the European Commission issued in April 2022 to Member States for reporting greenhouse gas emissions in 2023 (EC, 2022).
Prices for the coming years are based on forward market prices; the KEV has followed the same approach in recent years for shorter-term prices.

Table 4.5 Prices in the KEV2022 with defined and planned policies (constant average prices for 2021) (Source: PBL, 2022a)

	2000	2005	2010	2015	2020	2021	2025	2030	Layer 2030	High 2030	2040
North Sea Brent oil (EUR per barrel)	46	58	71	53	39	60	92	92	70	107	97

Wholesale price of natural gas (EUR per m³)			0,22	0,23	0,13	0,31	0,43	0,37	0,21	0,45	0,37
Import ketelkols Netherlands (EUR per tonne)	48	71	82	65	58	94	81	81	60	120	86
Wholesale electricity price base load (euro per MWh)	63	56	58	44	33	103	93	73	50	93	87
Co2 European Emissions Trading System (ETS) (EUR per tonne)			17	8	26	53	86	110	87	149	179

IV Development of technology costs

Projections of future developments in the energy system make use of the National Energy Analysis System, a modelling suite with different models for supply and demand sectors.[156] The data and information used on expected costs, potentials and technical characteristics are regularly adjusted on the basis of new insights from studies such as TNO, IEA, IRENA and scientific literature (see Table 4.6). PBL also uses the detailed studies carried out within the Netherlands to substantiate the subsidies granted under the SDE + for different renewable energy technologies.

Table 4.6 Overview of sources used for expected cost developments energy technologies in the KEV2022 (sources: PBL, 2022b; TNO, 2023b)

Technology	Author (s)	Year	Title	Reference (s)
Geothermal heat	CE delft, IF Technology	2018	Gas road, opportunities for the new concepts of Lage Temperature Aardheat and mine water	Delft, CE Delft, May 2018, see report on CE website
Biofuels	IEA	2020	Advanced biofuel potential for cost reduction	
Biofuels	PNNL	2013	Process Design and Economics for the Conversion of Lignocellulosic Biomass to Hydrocarbon Fuels Fast pyrolysis and hydrotreating Bio-oil Pathway	
Biofuels	PNNL	2015	Biomass Direct liquefaction Options: TechnoEconomic and Life Cycle Assessment	

[156] for more information, see Climate and Energy Assessment (KEV) | PBL Planbureau voor de Leefomgeving.

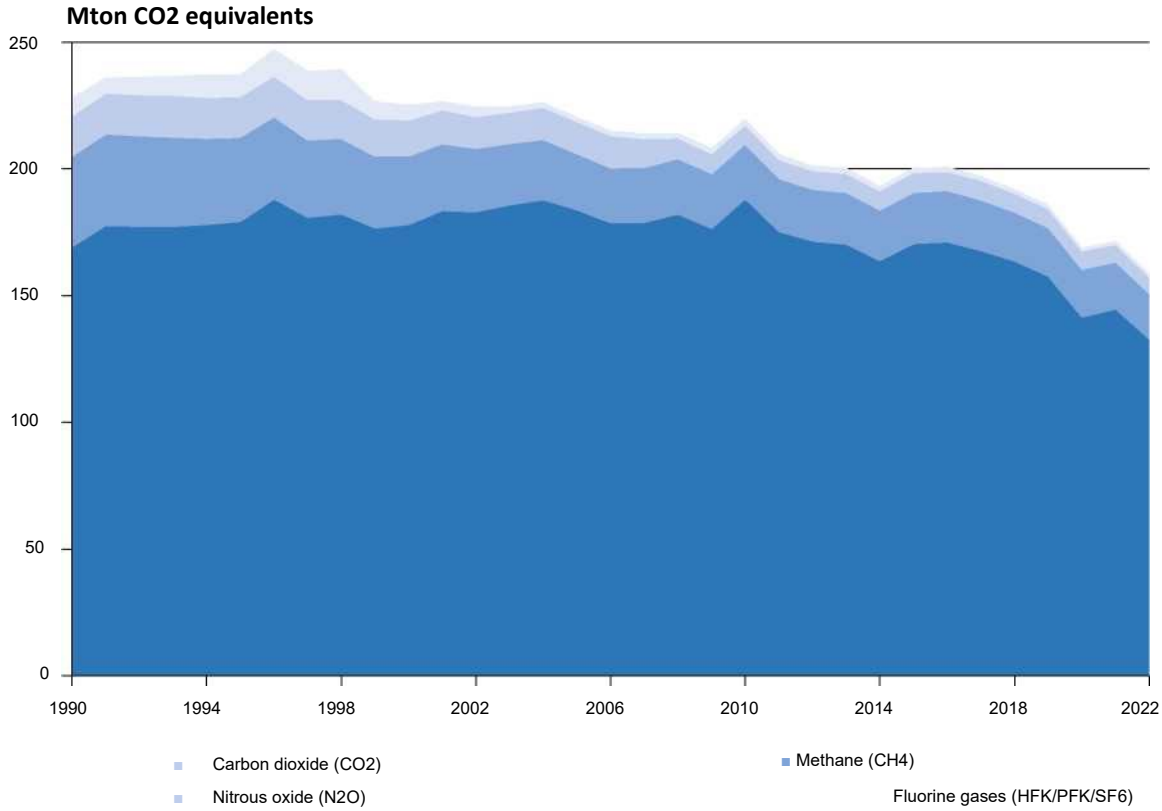
Technology	Author (s)	Year	Title	Reference (s)
Biofuels	Zhang Z, Zhu Z, Shen B, Liu L	2019	Insights into biochar and hydrochar production and applications: a review	Energy
Biogas	Qie, S., Hailg, L., Longcheng, L., Zhixin., Xinhai, Y.	2015	Selection of appropriate biogas upgrading technology-a review of biogas cleaning, upgrading and utilisation	Renewable and Sustainable Energy Reviews 51 (2015) 521-532
Biofeedstocks chemistry	JRC	2019	Insights into the European market for bio-based chemicals	
Biomass	Dimitriou, I., Goldingay H., Bridgwater A.V.	2018	Techno-economic and 166ort he166s d analysis of Biomass to Liquid (BTL) systems for transport fuel production	Renewable and sustainable Energy Reviews 88 (2018) 160-175
Bio-methane	Capra, F., Magli, F., Gatti, M.	2019	Biomethane liquefaction: A systematic comparative analysis of refrigeration technologies	Applied thermal Engineering 158 (2019) 113815
Bio-oil	Elliott, D.C.	2007	Historical Developments in Hydroprocessing Bio-oil	Energy labour-Fuels
Miscellaneous renewable electricity technologies	IRENA	2021	Renewable Power Generation Costs in 2020	
Advanced biofuels	Landälv, I., Waldheim L.	2017	Building up the future cost of bio fuel	
Methanol	IRENA	2020	Innovation Outlook Renewable Methanol	
Hydrogen	EIGA	2013	Best Available Techniques for the Co-production of Hydrogen, Carbon monoxide their Mixtures by Steam Reforming	
Hydrogen	IEA	2019	The Future of Hydrogen, Report prepared by the IEA for the G20	
Hydrogen	IEA	2017	Technological economic Evaluation of SMR Based Standalone (Merchant) Hydrogen Plant with CCS.	
Hydrogen	NOW	2018	Industrialisierung der Wasserelectrolyse in Deutschland	
Wind on land	IRENA	2019	Future of wind	https://www.irena.org/publications/2019/OCT/Future of wind
Wind on land	Beurskens, L. (TNO)	2021	Technology factsheet wind onshore	https://energy.nl/ wp content/uploads/ technology-factsheet-wind-onshore-9.pdf
Wind at sea	Beurskens, L. (TNO)	2021	Technology factsheet wind offshore	https://energy.nl/ wp content/uploads/technology-factsheet – wind-offshore 9.pdf

Technology	Author (s)	Year Title	Reference (s)
Solar PV	Beurskens, L. (TNO)	2019 variable technology factsheets on solar PV	https://energy.nl/ wp content/uploads/ solar_pv_15_kwp-1_ mwp_south-1-7.pdf https://energy.nl/ wp content/uploads/ solar_pv_15_kwp-1_ mwp_east-west-1-7. PDF https://energy.nl/ wp content/uploads/ solar_pv_ groundbased_ above_1_mwp_ south-1-7.pdf https://energy.nl/ wp content/uploads/ solar_pv_floating_ above_1_mwp_ south-1-7.pdf

4.2 Decarbonisation dimension

I Trends and projections of greenhouse gas emissions and sequestration

Figur4.1 Greenhouse gas emissions in the Netherlands from 1990 to 2 022 in megaton CO2eq. (including LULUCF) (Source: CBS et al., 2024b)



Historical trend of national greenhouse gas emissions so far

After an initial increase between 1990 and 1996, greenhouse gas emissions in the Netherlands show a decreasing trend with a peak in 2010 (due to a relatively cold winter) and a limited increase in 2015 (see Figure 4.1). In 2022, emissions amounted to 158 megaton CO2eq. (including LULUCF), 31 % below 1990 levels. CO2emissions decreased by around 1 990 megatons between 2022 and 36, of which a large part after 2016. This is largely due to the closure of coal-fired power plants and an increase in the generation of energy from renewable sources. In the last year, from 2021 to 2022, the decline was mainly due to high natural gas prices. These have led to a significant reduction in natural gas use in industry, built environment and agriculture.

Non-CO2 emissions have long seen a decreasing trend. For methane emissions, the decrease was mainly due to the decrease in the use of landfills; emissions of fluorine gases have been reduced mainly by regulation. The largest reduction in low gas emissions was due to a change in the nitric acid production process.

Preliminary figures show that the reduction in greenhouse gas emissions continued in 2023: in that year, greenhouse gas emissions decreased by a further 6 % compared to 2022 (CBS, 2024d).157

I Provision of national greenhouse gas emissions up to 2030

In the policy variant “adopted policies”, national greenhouse gas emissions decrease to 122,5-127,9 [114-139] megaton CO2eq in 2030. This is a decrease of 44.5 megaton CO2eq compared to 2020) (see Figure 4.2) (source: PBL, 2022a). Of this expected

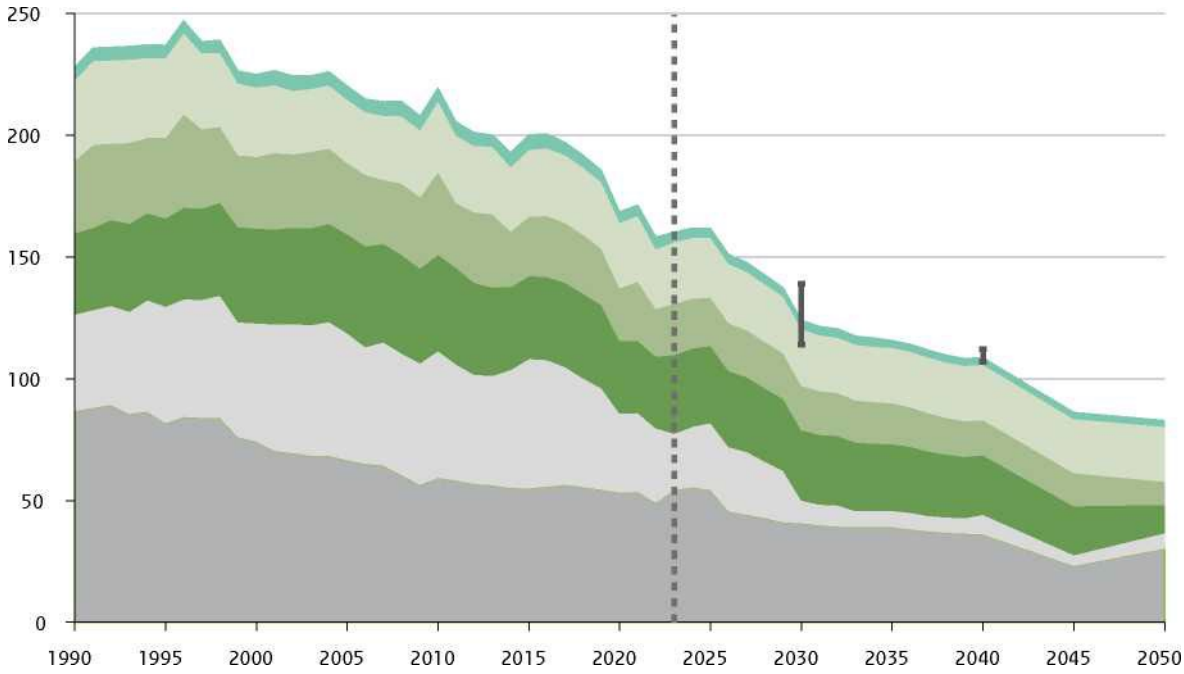
157 provisional figures for 2023 were not well suited to be reflected in texts, figures and tables due to a limited level of detail.

decrease, almost 12.5 megaton CO2eq is due to developments in industry (see Table 4.7).

The decrease is mainly due to the introduction of CO2 emission reduction techniques that become cost-effective due to the combination of the high CO2price in the European ETS, the SDE + + and the nationalCO2 levyfor industry.
The biggest contribution comes from CO2capture and storage (CCS), electrification, energy savings, and reductions in methane and low gas emissions.

In the built environment (households and services), emissions are estimated to fall by 3.5 megaton CO 2030 eq between2and 2020. Although the number of households is increasing, gas consumption and associated emissions are expected to decrease. This is due to sustainable new construction, sustainability during regular housing improvement, warmer winters and economical combustion behaviour due to high gas prices. For buildings in the services sector, we see the same developments.

In the mobility sector, emission reductions between 2020 and 2 030 in the 'adopted policies' policy variant have been estimated at 1,7megaton CO 2eq., due to an accelerated growth of electric cars and the use of more renewable fuels. In agriculture, emissions are estimated to fall by almost 4 megatons of CO 2030 eq between2and 2020, mainly due to lower gas consumption in greenhouse horticulture. Emissions from livestock and arable farming are reduced by fewer fertiliser use and a smaller herd. Net emissions from land use are expected to decrease by 0,6 Megaton CO2eq in 2030 compared to 2020, due to a reduction in grassland area, policy measures that reduce the emission of peat and modest soils with less CO2 and higher CO2sequestration in existing forests.



Figur4.2 Historical and projected greenhouse gas emissions 1990-2050 by sector (including LULUCF) (Sources: Emission recording, 2024a (realisation); PBL, 2022a (projections with defined policy until 2040); and TNO, 2023a (projections to 2050)

II Provision of national greenhouse gas emissions between 2030 and 2050

In the period after 2030, national greenhouse gas emissions are expected to decrease further in line with adopted policies. The decrease in emissions after 2030 is mainly explained by expected developments in industry, mobility and built environment. Emissions in these sectors fall by 13 megaton CO 2040 eq between2and 2030. (see Table 4.7). As a complement to the KEV2022, EZK requested TNO to make a reference scenario of greenhouse gas emissions from 2040 to 2050, in line with the projections of the KEV2022 (TNO, 2023a). According to this study, the projected emissions fall to 83 megaton CO2eq in 2050. This brings emission reductions to more than 63 % in 2050 compared to 1990. Figure 4.2 shows that emissions fall after 2040, but show a slight smoothing between 2045 and 2050. On the one hand, this is due to decreasing emissions in the built environment and transport sectors, while on the other hand an increase is expected in the energy and industry sectors towards 2050.

Table 4.7 Realised and projected greenhouse gas emissions by climate sector (in megaton CO2eq.)
(Sources: Emission recording, 2024a (realisation); PBL, 2022a (projections with defined policy until 2040); and TNO, 2023a (projections 2050)

Sector[1]	Realisations				Projections		
	1990	2005	2021	2022	2030	2040	2050
Electricity	39,6	52,1	32,4	30,5	7,5-12,9	6,2-11,6	6,3
Industry	86,8	66,7	53,6	49,2	40,8	36,2	30,4
Built Environment	29,7	29,3	24,3	19,6	18,3	14,5	9,5
Agriculture (excl. land use)	33,0	26,1	27,0	24,5	23,3	22,7	22,6
Use of land	5,4	5,5	4,4	5,1	3,7	2,9	2,7
Mobility[2]	33,4	40,6	29,7	29,5	28,9	24,4	11,6
Total	228,1	220,4	171,5	158,4	122,5-127,9	106,9-112,3	83
Reduction from 1990 onwards [%]	—	3 %	25 %	31 %	44-46 %	51-53 %	63 %

[1] sector classification based on the Climate Plan 2021-2030. This differs from the CRF classification used in EU and UN reporting. For example, emissions from mobile tools are all covered by mobility in this table. The emissions according to the CRF classification are presented in the Annex [5].
[2] excluding international aviation and shipping.

Large uncertainties in projections

The Climate and Energy Outlook (PBL, 2022a) was issued in 2 022 in a context of considerable uncertainties. Russia's invasion of Ukraine is causing unrest and scarcity in energy markets. The extent to which there is a relatively cold or hot combustion year is also an important uncertainty for emissions in a specific year. The estimated emissions from the KEV2022 under the policy variant "determined policies" for 2030 and 2040 have therefore been published with ranges. The uncertainties for 2 050 are even greater, as little policy has been formulated. However, only a point value for this is determined (TNO, 2023a).

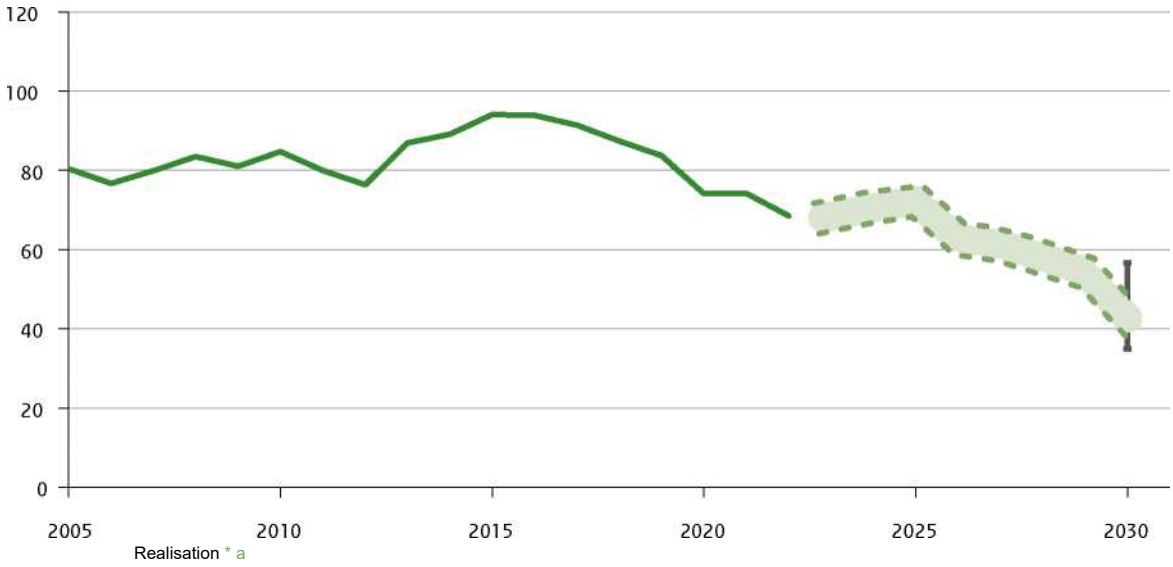
III Trends and projection of greenhouse gas emissions in ETS sectors

In the period 2005-2012, the emissions of Dutch companies participating in the European Emissions Trading System fluctuated around 80 megaton CO2eq. In 2013, ETS emissions increased significantly due mainly to an administrative reallocation of activities (with emissions) from non-ETS to ETS. In 2015 and 2016, total ETS emissions increased to around 94 megatons of CO2eq due to large emissions in the electricity sector and then decreased to 69 megatons of CO2eq in 2022. This decrease in ETS emissions until 2022 is mainly due to decreasing emissions in the electricity sector (from 50 megatons in 2015 to 30 megatons in 2022). There are several reasons for this trend, including the increased use of renewable energy and lower coal electricity production. ETS emissions from the Dutch industry were around 44 megaton CO2eq in 2013 and fall to 39 megaton CO2eq in 2022.

ETS emissions are expected to fall to a 33-55 megaton CO2eq to 2030 (see Figure 4.3). This decrease is due to the decrease in electricity production from coal and gas (see explanation above).

Figure 4.3 Historical and projected GHG emissions from ETS sectors in the period 2005-2030 (Sources: Emission recording, 2024b (realisation); PBL, 2022a (projections with defined policy))

Mton CO2 equivalents



IV Trends and projection of greenhouse gas emissions in non-ETS sectors

In Europe, national targets for greenhouse gas emissions not covered by the European Emissions Trading System have been agreed, further referred to here as non-ETS. These include emissions from mobility, almost all emissions from the built environment, most of agriculture and a limited part of industry. Emissions from land use are not covered by the non-ETS targets, but are covered by the LULUCF Regulation which are discussed separately below. For the period 2013-2020, the non-ETS targets and regulations are laid down in the Effort Sharing Decision (ESD). Within the ESD, the Netherlands had an emission reduction obligation of 16 % in 2020 compared to 2005. This was translated into a set of annual caps on the permitted amount of emissions in the period 2013-2020, which together applied as a cumulative target for the whole period. The maximum cumulative emissions allowed for the Netherlands under the ESD for the period 2013-2020 were 921 megaton CO2eq.

For the period 2021-2030, the Dutch non-ETS declaration is contained in the Effort Sharing Regulation (ESR). In the ESR, the Netherlands has an (adjusted) emission reduction obligation of 48 % in 2030, also compared to 2005. This task has also been translated into decreasing annual emission allowances (AEAs) and cumulative targets for 2021-2025 and 2026-2030. For the whole period 2021-2030, these are estimated at 833 megatons of CO2eq, but this needs to be finalised for 2026-2030.

Non-ETS emissions decreased from 135 megaton CO2eq in 2005 to 109 megatons in 2013 (see Figure 4.4). The decrease in the period 2005-2013 is mainly due to a decrease in non-ETS emissions from industry of around 20 megatons of CO2eq. Reductions were also achieved in the electricity generation (3 megatons) and mobility (4 megatons) sectors during that period. In 2013, non-ETS emissions decreased due to, inter alia, an administrative reallocation of activities (with emissions) from non-ETS to ETS. Between 2015 and 2018, non-ETS emissions stabilised around 100 megaton CO2eq. Emissions of non-CO2 greenhouse gases also decreased significantly by 8 megatone in this period, mainly due to abatement measures in nitric acid production.

Themaximum cumulative emissions allowed for the Netherlands for the period 2013-2 020 are 921 megaton CO2eq. Total emissions for that period amount to 787 megaton CO2 eq, well below the mandatory cumulative emissions cap (see Figure 4.4).

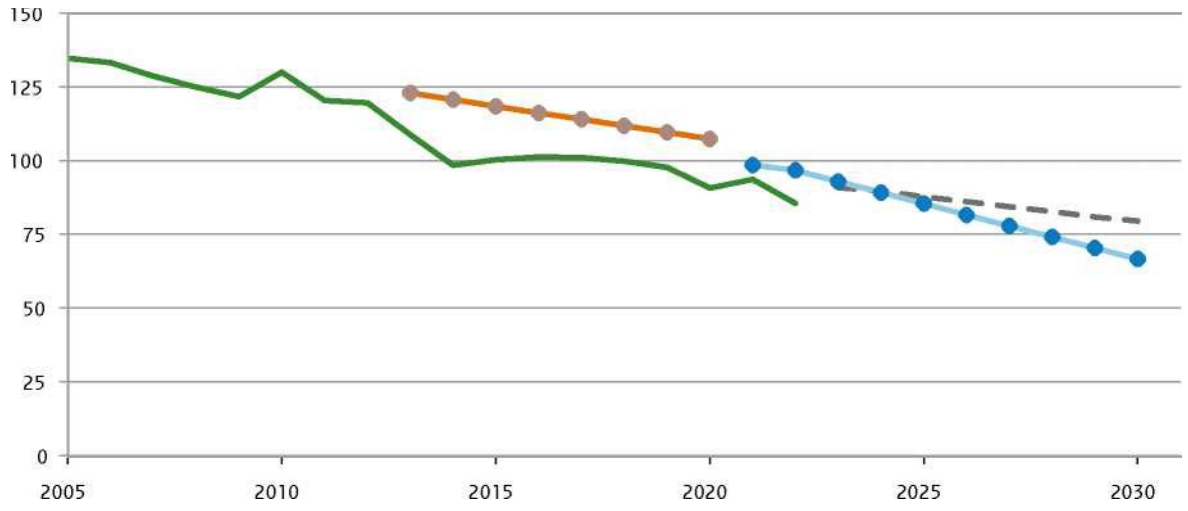
Table 4.8 Non-ETS greenhouse gas emissions 2 005 to 2030 based on established policies (in megaton CO2eq.; excluding LULUCF; scope according to the third ETS trading period from 2 013 to 2020) (Sources: Emission registration, 2024b (outputs) and PBL, 2022a (projections))

Sector[1]	2005	2010	2015	2020	2021	2022	2025	2030
Electricity	5,2	2,5	3,2	0,5	0,8	1,0	0,2	0,2
Industry	33,8	26,7	12,0	12,1	12,0	11,3	11,7	9,1
Mobility[2]	40,8	39,8	34,1	29,9	29,8	29,6	31,6	28,9
Built environment	29,3	33,8	24,3	21,6	24,2	19,6	19,7	18,1
Agriculture and horticulture	25,7	27,1	26,7	26,5	26,7	24,1	24,2	23,2
Totals	134,7	130,0	100,3	90,7	93,6	85,5	87,7	79,5

[1] sector classification based on the Climate Agreement. This differs from the CRF classification. For example, emissions from mobile tools are all covered by mobility in this table. Annex 5 presents the emissions according to the CRF classification.
[2] excluding international air and maritime transport.

The maximum cumulative emissions allowed for the Netherlands for the period 2021-2 030 are expected to be 833 megaton CO2eq. Based on established policies, the cumulative estimated non-ETS emissions for 2021-2030 amount to 861 megaton CO2eq.

Figure 4.4 Historical and projected greenhouse gas emissions from non-ETS sectors in the period 2005-2030 (Sources: Emission recording, 2024b (realisation); PBL, 2022a (projections with defined policy))



v Sectoral developments in greenhouse gas emissions in non-ETS sectors

Built environment

Emissions in the built environment have gradually decreased since 2005 from 30 megatonnes of CO2equivalents to 20 megatons in 2022 (without temperature correction, of which 0.3 megatons are covered by ETS), despite the fact that during this period the number of households increased from 7.1 million to 8.1 million (CBS, 2023a) and the floor area of utilities has increased. Emissions are expected to fall to 18 megaton CO2 equivalents in 2030 (of which 0.2 megatons are covered by ETS) (PBL, 2022a).

The decline in households is due to reduced natural gas consumption due to insulation measures and the use of more efficient heat boilers in existing buildings, demolition and the construction of energy-efficient new buildings.
The decline in the services sector is due to energy savings in existing construction, demolition, energy-efficient new buildings, less space heating due to climate warming, increased use of electric heat pumps instead of natural gas-fired boilers and reduced use of heat/power generation. Within the services sector, a declining trend has also been visible from 2011 onwards due to efficiency requirements under the Ecodesign Directive on lighting, ICT, pumps and fans in buildings. In the period from 2021 onwards, the energy saving obligation also plays a role in further reductions in energy consumption.

Industry

A limited share of greenhouse gas emissions from industry is not covered by ETS (around 11 megaton CO2eq in 2022). The aforementioned developments relevant to industry ETS emissions are also relevant for the non-ETS emissions. Non-ETS CO2emissions are expected to gradually decrease to around 2 030 megatonnes by 9. This is mainly due to decreasing methane emissions from landfills and F-gases as a result of the implementation of the European F-Gas Regulation.

Mobility

Between 1990 and 2008, CO2emissions increased by around 8 megatons due to an increase in domestic traffic and transport due to economic growth. Following the 2008 economic crisis, emissions fell rapidly. Despite the recovery of that economy, emissions remained more or less stable in the period 2015-2 019 at around 35 megatons of CO2eq. The relatively strong growth in transport volumes in 2018 was offset by a more efficient vehicle fleet and increased use of biofuels for mobility. In the period 2020 to 2022, emissions fell to 30 megaton CO2eq., also as a result of the coronavirus pandemic and increased energy prices.
Greenhouse gas emissions are expected to fall slightly to 29 megaton CO2eq by 2030. This decrease is largely due to the strengthened European source-based policy for CO2emissions from new vehicles, despite growing traffic volumes.

Greenhouse gas emissions from the combustion of bunker fuels from international aviation and shipping are excluded from national emission totals. Between 2000 and 2007, these emissions increased from 53 to 67 megaton CO2eq. Thereafter, emissions fell to around 44 megatons in 2021. In 2022, there was an increase of 46 megatonnes. Under established policies, this item is expected to grow to 49 megaton CO2eq in 2030.

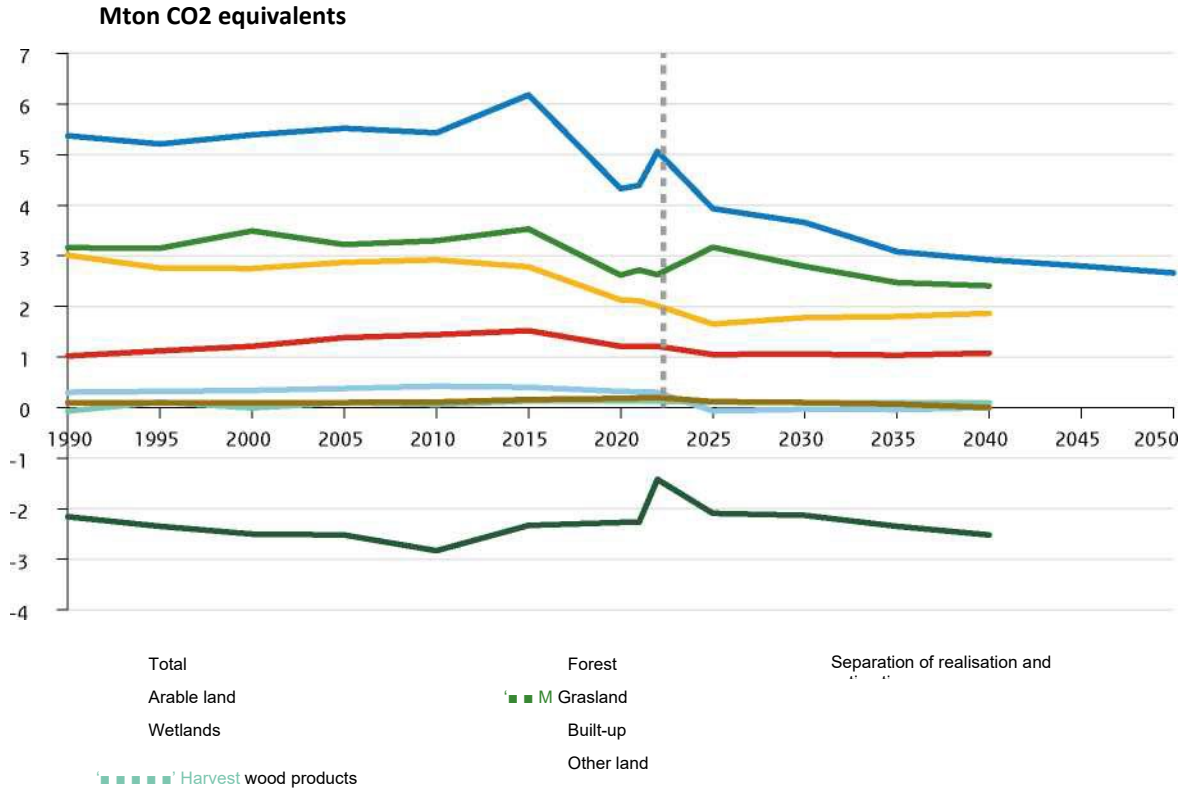
The marketing of bunker fuels to international shipping is expected to remain stable in the coming years. It was estimated at 2 030 megatons in 34, at the same level as in 2021. Emissions from the marketing of bunker fuels to inland waterway transport are also stable and are estimated at 2.8 megaton CO2eq in 2030. Emissions from the marketing of bunker fuels to international aviation in 2030 have been estimated at 11.9 megaton CO2eq., a level similar to those in the period 2017-2019. The coronavirus pandemic sharply decreased to around 7 megatons of CO2eq in 2020 and 2021, reaching 2 022 megatons in 9,6.

Agriculture and horticulture

Greenhouse gasemissions from agriculture and horticulture amounted to approximately 24.4 megatons of CO2eq in 2022. A large part (about 19 megatons) is made up of methane and nitrous gas, mainly from livestock farming and arable farming. These emissions are expected to fall to 18,2 Megaton CO 2030 eq by Megaton of CO2eq by due to, inter alia, a reduction in livestock numbers due to abandonment and extensification and additional reduction measures. The CO2emissions in 2021 amounted to 5.5 megatonnes (Emission registration, 2024a). Most of the CO2emissions from agriculture come from glasshouse horticulture. Energy is consumed there to heat, highlight and fertilise greenhouses with CO2. The total area under greenhouses has fluctuated in recent years: after a gradual increase between 2000 and 2010, the area fell by 15 % until 2018. Thereafter, the area increased sharply by 18 % to 10.637 ha in 2022). Nevertheless, CO2 emissions in 2022 were at very low levels (5.5 megatons, 29 % compared to 2021), mainly due to high natural gas prices. In the policy variant with adopted policies alone, the CO2emissions in agriculture and horticulture from more efficient and innovative greenhouses are expected to reach around 5 megatons in 2030 (of which 0.1 megatons within the ETS).

VI Trends and projection of greenhouse gas emissions in the LULUCF sector

Figure 4.5 Emissions and sequestration of greenhouse gases from the LULUCF sector, expressed in megaton CO2eq. (Source: Emission recording, 2024a (realisation); PBL, 2022a (estimate))



Emissions from LULUCF decrease

In the Netherlands, grassland, agricultural land and cultivated land are the main sources of so-called Land Use, Land Use Change and Forestry (LULUCF) emissions. Forests record net CO2. The net emissions of all land use categories taken together show a decreasing trend from 2022 to 5,4 MCO2eq per year from 5,1 to 1990 (see Figure 4.5). In addition to a small contribution of nitrous gas and methane (0,1 and 0.6 megaton CO2eq respectively), this emissions are almost entirely made up of CO2. The trend in net emissions is the result of decreasing emissions from changed agricultural land use (smaller area, less peatland), an increase due to the expansion of the cultivated area, and a lower net uptake by forests. Forest uptake has gradually decreased from 2,2 to 1.4 megaton CO2eq; this had a significant impact on emissions in 2022. Emissions from agricultural land use (cropland and grassland) over the period 1990-2022 show a decreasing trend, from 6,2 to 4.6 megaton CO2eq. This trend is due to a decrease in the agricultural area and the area of peatlands. Emissions from the increase in urban areas (built-up) increased from 1,0 to 1.2 megaton CO2eq in this period.

Projected LULUCF emissions

Total net LULUCF emissions are estimated to decrease to 3.7 megaton CO2eq in 2030 (PBL, 2022a) based on adopted and planned policies. This decrease is mainly due to a decrease in emissions from grasslands. Within the estimate, there is a decrease in both the area of grassland and the area of peat and modest land. In addition, emissions are expected to decrease as a result of the implementation of policy measures. The effects of the planned planting of new forest under the forest strategy and the effects of the regional peatland strategies of the provinces of Friesland and Utrecht have been taken into account (Arets *et al.*, 2022). It is expected that 13.425 ha of new forest will be planted by 2030 to compensate for conversion from forest to other nature. Together with a reduction in deforestation, it is estimated that this will lead to an additional forest sequestration of 157 ktonnes of CO2 in 2030 compared to 2020. The effects of the peat grazing strategies have been passed on to the

based on the research results of the national research programme for greenhouse gases peat meadows (NOBV) and the registration system SOMERS (*Erkens et al.*, 2022). An increase in the groundwater level in Friesland results in an emission reduction of 244 kton CO2 per year, while the use of water infiltration techniques and transitions to wet nature/agriculture in Utrecht will lead to a reduction of 64 kton

CO2 per year. In the period after 2030, these trends are expected to continue and forests are expected to commit more than megatonnes of CO2eq. The estimate based on adopted and planned policies for 2040 for total net LULUCF emissions is 2.9 megaton CO2eq. According to the TNO reference scenario, the decrease continues to reach 2.7 megaton CO2eq in 2050 (RIP, 2023a).

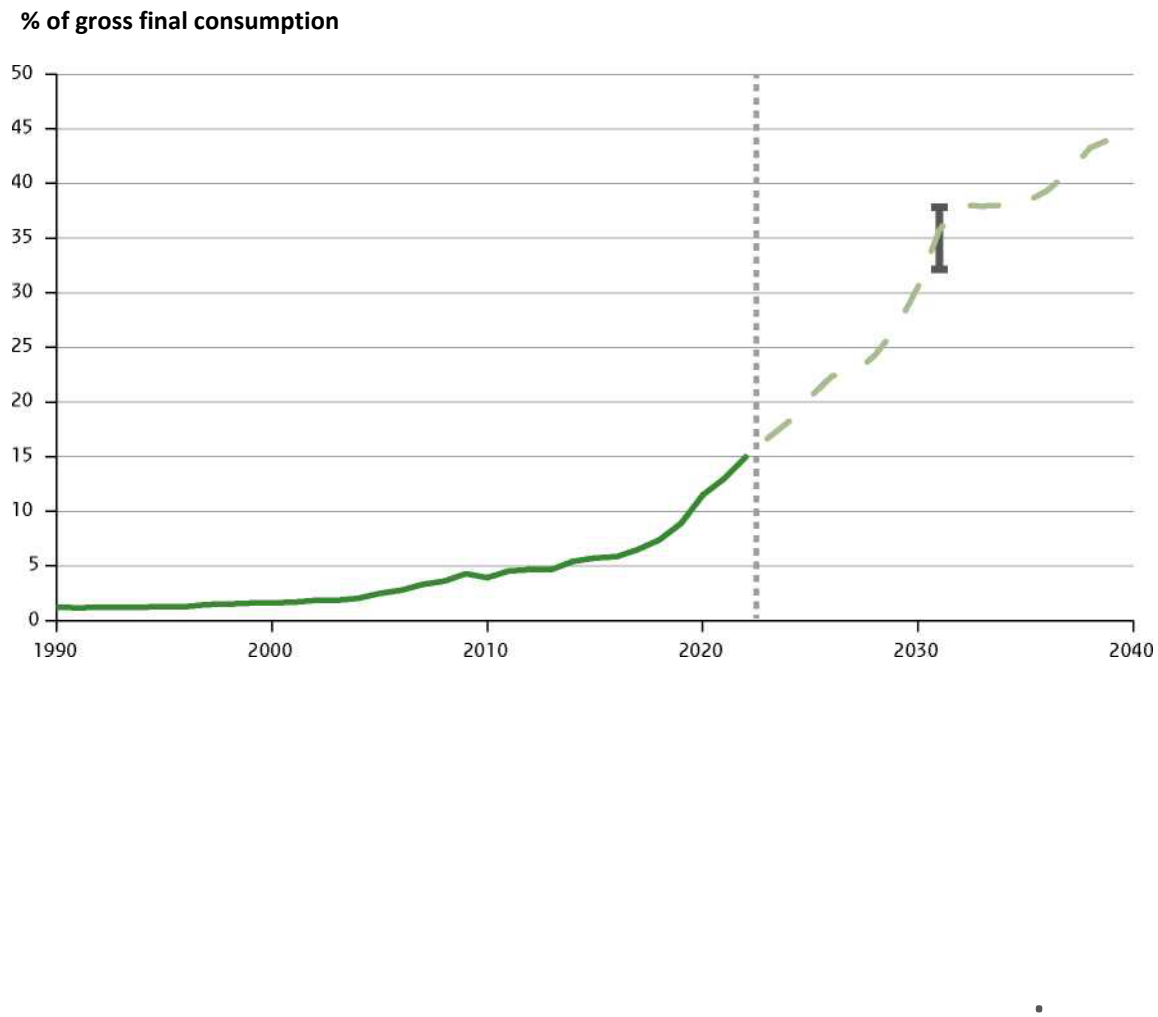
LULUCF Implementation Status

The projections of emissions and removals according to the KEV2022 show that at the end of both performance periods under the revised LULUCF Regulation, 2025 and 2030, an annual net surplus in the emission budget (credit) is expected to be an average of 1 megaton CO2 eqand 0.65 megaton CO2 eqrespectively. In the first performance period (2021-2025), the net credit is therefore 4.9 megaton CO2eq and in the second performance period (2026-2030) this is 3.2 megaton CO2eq. This is expected that the targets under the LULUCF Regulation will be met with the current adopted policy.

In order to meet the strengthened monitoring requirements of the revised Regulation, work is ongoing to improve LULUCF methodologies to bring them to a higher IPCC Tier level. In 2023, a Tier 3 method for carbon stock changes in mineral agricultural soils was introduced. Investments are also made to develop improved methodologies for monitoring greenhouse gas emissions from peatlands and increasing the tier level for emissions from Wetlands. An analysis of the tier levels of the applied methodologies in the first performance period has been carried out by Wageningen University, which shows that the Netherlands will comply with the monitoring requirements of the Regulation in this period. For the second performance period, further improvements are currently being examined in order to meet the enhanced requirements.

II Trends and projection of renewable energy

Figure 4.6 Development of renewable energy share with defined policies as share of gross final consumption between 2000 and 2030 (Source: PBL, 2022a; CBS, 2023b)



I Historical trend of renewable energy share

The share of renewable energy according to the European Renewable Energy Directive (2009/28/EC) has increased since 2000 from 1.6 % to 15 % in 2022 (CBS, 2023b; see Figure 4.6). With an administrative purchase ("statistical transfer") of 2.5 % (49 petajoules) from Denmark, the European target set for the Netherlands of 14.0 % renewable energy was met in 2020. In 2021, the domestic share increased further to 13.0 % and to 15 % in 2022 (CBS, 2023b). Key drivers for the increase are the introduction of renewable energy subsidy schemes (MEP in 2003 and SDE in 2008, SDE + in 2011 and SDE + + in 2020) and the blending obligation for renewable fuels in transport from 2007 onwards. In 2022, total gross final consumption was 1.850 petajoules (7 % lower than 2021), of which 277 petajoules come from renewable energy sources (CBS, 2023b). The share of biofeedstocks in 2022 110 was petajoules: 40 % of total renewable energy (CBS, 2023b). In 2021, the share was still 49 %. This decrease is due to a decrease in the majority of solid biomass in power plants and increased sustainability requirements from REDII. The contribution of wind energy to total final renewable energy consumption in the Netherlands was 2022 28 % in 2018 and the contribution of solar energy was 22 %. Geothermal and soil energy have grown relatively strongly in recent years. Geothermal energy accounted for 2 % of final consumption of energy from renewable sources in 2022. Outdoor air heat and soil energy together account for 7 % of final consumption in 2022 (CBS, 2023b).

The consumption of renewable electricity has also increased, with renewable electricity from biosoil stabilised in recent years, while wind and solar electricity has increased rapidly. In 2022, gross normalised domestic production of renewable electricity was 40 % of electricity consumption (CBS, 2023c).

The share of renewable heat in total final energy consumption for heat has slowly increased since 2000 to 8.8 % in 2022 (CBS, 2023c).

The share of renewable energy for transport based on physical renewable energy consumption has increased since 2005 to 11 % in 2022 (CBS, 2023c), in particular in the form of biofuels. The achieved share of renewable energy for transport is not exactly the same as the national obligation for the companies supplying biofuels due to differences in definitions. For example, it is possible for fuel suppliers to maintain administrative stocks. According to the Dutch Emission Authority, fuel suppliers have complied with their national blending obligation for renewable energy, this share was 2022 17.9 % in 2018 (NEa, 2023a).

II Project development share of renewable energy

The share of renewable energy is expected to increase from 13.0 % in 2021 to 30,5 [26,9-32,6]% in 2030 and 44.6 % in 2040 (see Figure 4.6, PBL, 2022a). The National Energy and Climate Plan 2021-2030 of 2019 sets out an indicative trajectory where the contribution of renewable energy is at least 19.6 % in 2025 and 27 % in 2030. The initial indicative target for 2030 is likely to be met due to policy adjustments made in the past year, in particular to build additional offshore wind farms. Under the REDIII and REPowerEU, the European Council and the European Parliament reached an agreement to increase the share of renewable energy at European level from 2030 to 42.5 % in 32. As a result, the contribution of the Netherlands will reach a share of at least 39 %. In order to achieve this, a considerable additional effort would therefore be required compared to the policy adopted under the KEV2022. Chapter Five looks at the impacts including planned and agenda policies according to the KEV2023.

In 2 022.110 petajoules, or 40 %, of renewable energy consumption came from biofeedstocks (see Figure 4.7). For the first time since 2022, the consumption of energy from biofeedstocks decreased in 2016 (-13 % compared to 2021). This is due to a decrease in the majority of solid biomass in power plants and increased sustainability requirements from REDII.

The CBS publishes every year the most up-to-date data on biomass consumption, including deployment in different sectors and households (CBS, 2023d, 2023e). Within the total consumption of the combined sectors in 2022 (185.022 TJ), in addition to biomass combustion for energy (energy sector, waste operators, households), biogas production (7.725 TJ) and biotransport fuel production (26.557 TJ) as a destination for various types of biomass.

Bioeconomy Platform reports annually on the deployment and source of woody bioraw materials for energy in the Netherlands (PBE, 2023). These are installations of 1 MW and larger for heat and/or electricity. In 2022, this sector used more than 4 million tonnes of woody biomass, of which about a third comes from its own soil.

In addition, CE Delft is carrying out a study on the supply and demand of various renewable energy carriers and sustainable carbon carriers – including bio-raw materials – at European level. This research will identify aggregate supply and demand and identify a possible gap between supply and demand and the need for imports and demand reduction. 184 petajoule energy consumption from biofeedstocks is expected for 2040, mainly due to an increase in energy consumption from biogas (KEV2022).

The installed capacity of wind turbines increased from 4.4 gigawatts in 2017 to 8.8 gigawatt 2022 (CBS, 2023c). A very large increase is expected in the coming years: the installed capacity of wind energy is projected to rise to 23.2 gigawatts in 2030, of which 15.8 gigawatts

from offshore wind energy. In 2040, it grew to 28.3 gigawatts, of which 21.2 gigawatts were generated by offshore wind energy (KEV2022).

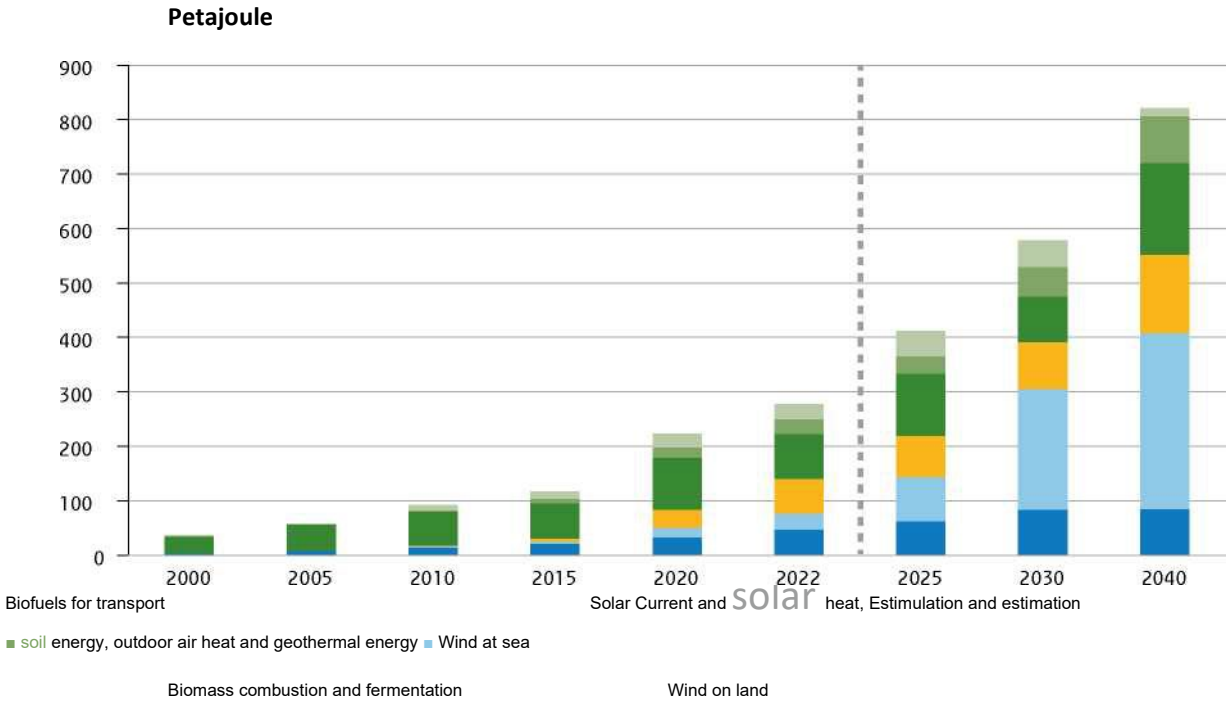
Solar energy consumption (mainly electricity) increased from 2018 to 2 022 petajoules between 15 and 62. The capacity of solar panels for solar electricity increased from 4.6 gigawatts in 2018 to a total of 19.1 gigawatts at the end of 2022 (CBS, 2023c). The installed capacity is expected to grow further to 22.7 gigawatts in 2025 and 25.7 gigawatts in 2030 and to 42.6 gigawatts in 2040 (KEV2022). Despite expected growth, solar generation capacity is limited due to electricity network bottlenecks. Subsidies for small-scale solar panels via ISDE were available until 2023. The SDE + + is looking for an alternative form of stimulation for solar PV and onshore wind, which provides a lighter level of financial support than the SDE + +, so that excess profits can be avoided in the future.

As a result of these developments, the expected share of renewable energy in gross electricity consumption will almost double, from 40 % in 2022 (CBS, 2023c) to around 86.2 % in 2030 and 95.5 % in 2040 (KEV2022).

The use of renewable energy in the built environment shows a steep upward trend that continues in the coming years. This is due to the increasing use of heat pumps in new construction, driven by building regulations and the tightening of energy performance requirements. More heat pumps are also being delivered in existing buildings as a result of the ISDE scheme (in which more budget is available) and the deployment of zero-meter renovations in rented dwellings. Outdoor air heat and soil energy are expected to double from over 20 petajoules in 2022 (CBS, 2023c) to 38.2 petajoules in 2030 and 57.6 petajoules in 2040 (KEV2022). Deep geothermal is expected to increase from 6.8 petajoules in 2022 (CBS, 2023c) to 15.9 petajoules in 2030 and 28.3 petajoules in 2040 (KEV2022).

The share of renewable heat in 2018 was 2022 8.8 % of the total final energy consumption for heat (CBS, 2023c). This share doubles according to the KEV2022, increasing to 14 % in 2030 and increasing further to 21 % in 2040. Biogas consumption increases from 7.7 petajoules in 2022 (CBS, 2023b) to 17,6 and 63.8 petajoules respectively in 2030 and 2040 (KEV2022).

Figure 4.7 Development of renewable energy technologies with defined policies (Sources: CBS achievements (2023c) and PBL projections (2022a))



The use of renewable energy for transport is regulated in the Netherlands in the form of an obligation for fuel suppliers to make an increasing share of the energy supplied to transport renewable. This annual commitment continues to increase until 2030 as part of the REDIII implementation; The Netherlands chooses to express this annual obligation under the REDIII in terms of emission reductions by 14.5 % in 2030 (NEa, 2023b). In addition, with REDIII, the aviation and shipping sectors have also become part of the annual obligation of the transport sector. Within this obligation, the use of advanced biofuels (biofuels from specific types of waste and residues laid down in EU legislation) and Renewable Fuels of Non Biological Origin (RFNBOs) are at a minimum.

There is a cap on the use of biofuels from food and feed crops and feedstocks from Annex 9b of the REDIII (such as used frying oils). The obligation can be fulfilled by using different forms of renewable energy.

The increasing annual renewable energy obligation until 2030 is expected to be filled in an increasing proportion with renewable electricity. To date, the vast majority of the obligation has been filled with the use of biofuels, but this will change in the coming years.

Driven by the increasing annual commitment, the share of biofuels in the mobility sector's energy consumption increases from 6 % in 2021 to 9 % in 2030 (KEV2022). The share of renewable energy for transport calculated in the European Directive is much higher, inter alia because it allows for double counting of some biofuels and also contributes to electricity use.

Thecontribution of renewable electricity actually entered under the annual obligation was 2022 2.7 % in 2009 (NEa, 2023a). This share is expected to increase significantly towards 2030. Road electricity consumption is growing relatively fast and an increasing proportion of it comes from renewable sources. In other forms of mobility, electrification of the land (such as inland waterway transport and construction machinery) is now becoming a reality.

4.3 energy efficiency dimension

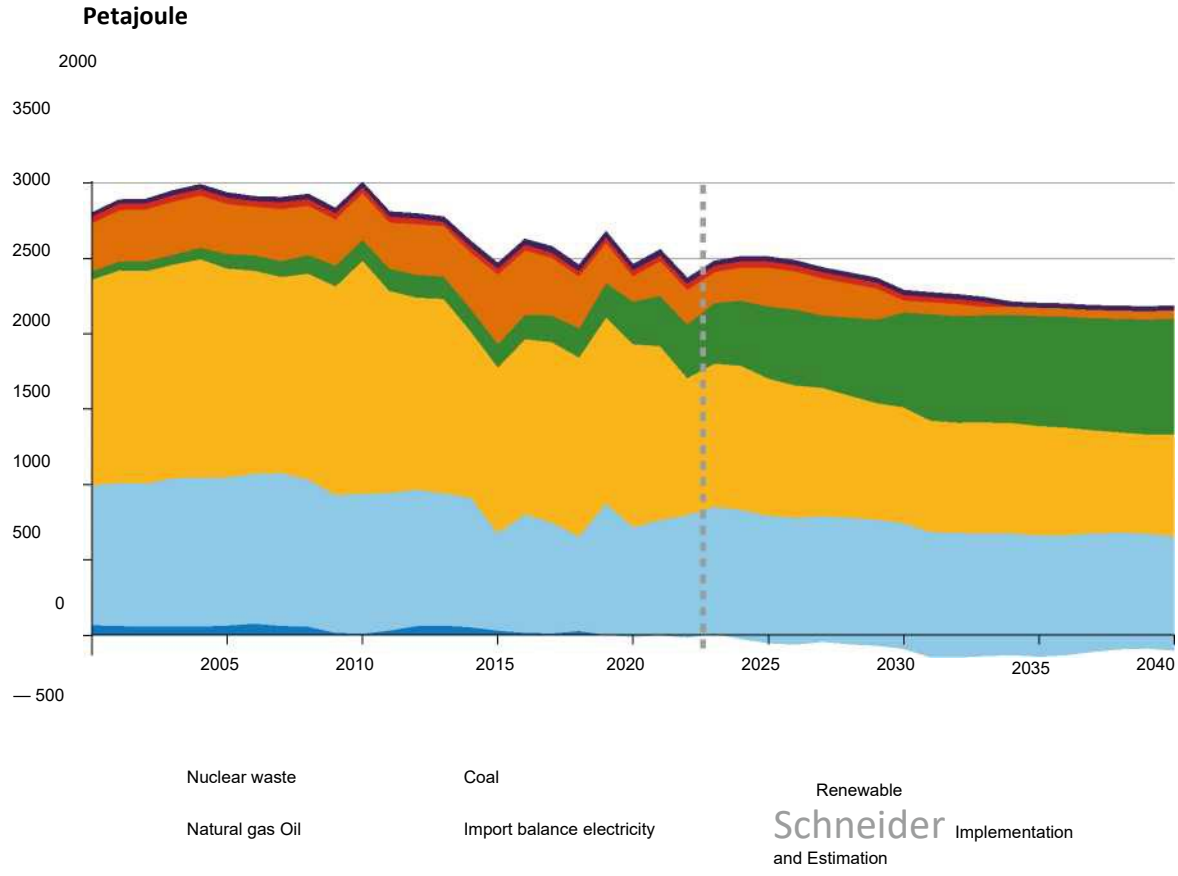
I Historical evolution of energy consumption158

Decreasing primary energy consumption 2000-2022

Total primary energy consumption in 2022 was 2.348 petajoules, 16 % lower than 2.803 petajoules in 2000 (see Figure 4.8) (Eurostat, 2023a). Primary energy consumption has gradually increased since the oil crisis in the early 1980s, reaching a peak in 2010, when consumption was at 3.003 petajoules.

Since 2000, natural gas consumption fell sharply from 1.364 petajoules in 2000 to 1.151 petajoules in 2021 and 910 petajoules in 2022 (a decrease of 16 % and 33 % respectively). This decrease is mainly due to a decreasing final consumption of natural gas for heat. The decline in 2022 was mainly driven by the sharp increase in natural gas prices. Renewable energy consumption increased sharply between 2000 and 2022, from 56 petajoules to 355 petajoules.
Coal consumption increased by 20 % between 2000 and 2017 with the entry into operation of three new coal-fired power stations and due to developments in the price of natural gas and coal, but fell sharply in the period thereafter, reaching a level 28 % lower in 2022 than in 2000. The consumption of nuclear fuels was slightly below the 2022 level in 2000; oil consumption was 12 % lower.

Figure 4.8 Realisation and projection of primary energy consumption per energy carrier (excluding non-energy use) (Sources: Eurostat (achievements), Eurostat 2023a; PBL (projections with defined policy), PBL, 2022a)



158In these paragraphs, primary and final energy consumption are based on the Eurostat definition “2020-2030” (both excluding non-energy consumption).

Decreasing final energy consumption 2000-2022

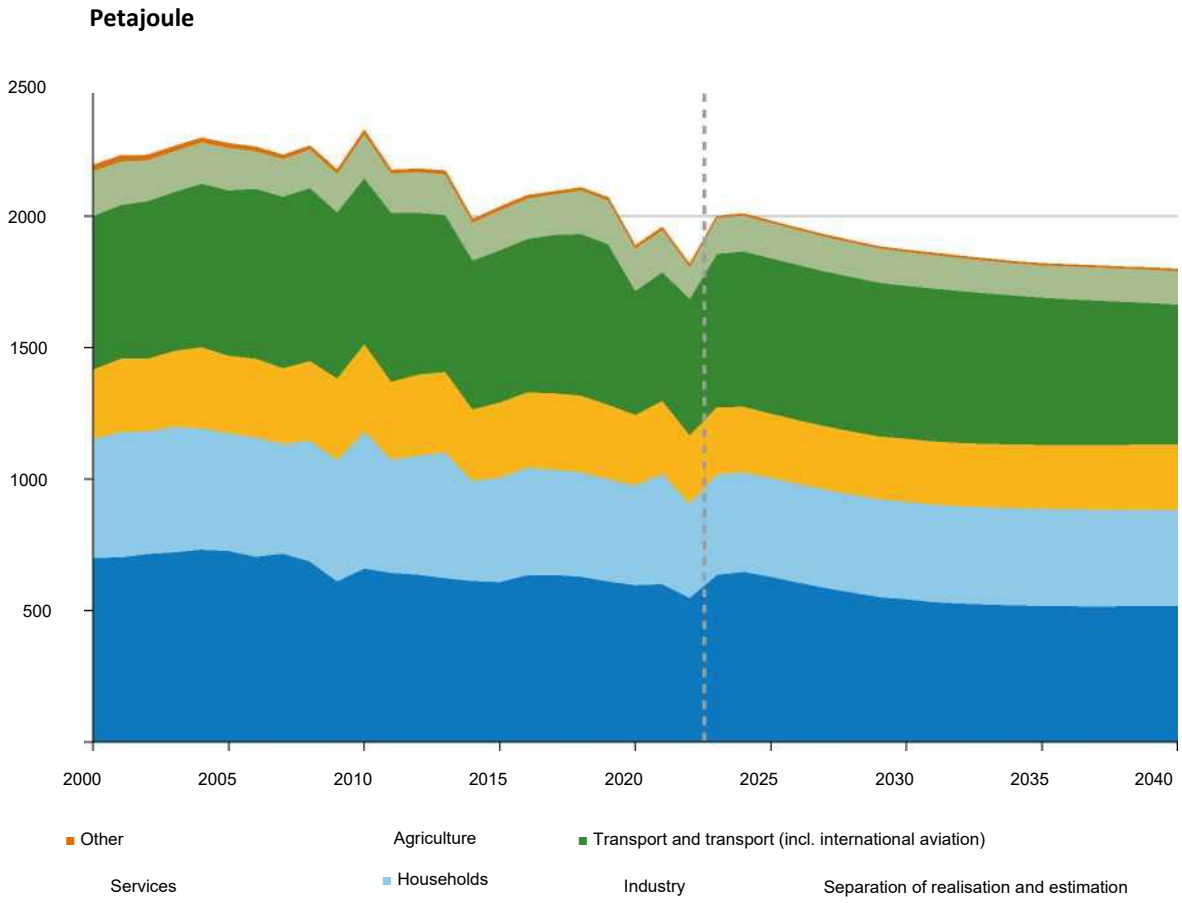
Final energy consumption in the Netherlands decreased between 2000 and 2022, from 2.181 petajoules to 1.819 petajoules (Eurostat, 2023b; see Figure 4.9) although there was an increase in final use between 2000 and 2010. There has been a gradual downward trend since 2010, with an additional large decrease in 2020 and 2021 due to the coronavirus pandemic. Final energy consumption remained low in 2022 due to high energy prices. The trend was particularly strong for households, where energy consumption decreased by 21 % from 2000 onwards. In addition to high energy prices in 2022, this was mainly due to improved residential insulation and efficiency improvements in heat supply, both through renovations and new buildings.

Total final consumption in industry decreased by 13 % between 2000 and 2021, while final consumption in industry was even much lower in 2022: at 20 % below the 2000 level. For traffic and transport, consumption increased between 2014 and 2019, an increase which was more or less in line with the evolution of traffic and transport modules. In 2020, the coronavirus crisis reduced energy consumption by 23 % compared to 2019, and in 2021 it was still 20 % lower than in 2019. In 2022, the level was 15 % lower than in 2019. Final energy consumption in agriculture, including glasshouse horticulture, decreased by 6 % between 2000 and 2021, and in 2022 final energy consumption was 28 % lower than in 2000. The consumption of heat within this sector is mainly dominated by glasshouse horticulture. It has been reduced by saving measures, by refurbishing and scaling up businesses (PBL, 2022a).

Electricity consumption in the agricultural sector increased until 2019, including through increased exposure.

In 2020 and 2021, consumption decreased again, partly due to lower product sales due to the coronavirus pandemic. The large drop in 2022 was also driven by the sharp increase in energy prices.

Figure 4.9 Realisation and projection of final energy consumption by sector (excluding non-energy consumption) (Sources: Eurostat (achievements), Eurostat, 2023b; PBL (projections with defined policy), PBL, 2022a).



II Energy Consumption Project

Use of fossil energy carriers is gradually decreasing

Primary energy consumption is expected to decrease to 2.238-2.279 [2.085-2.447] petajoule in 2030 and further to 2.113-2.156 petajoules in 2040. This is above the target consumption of 1.935 petajoules in 2030. The consumption of natural gas will decrease (see Figure 4.8) due to the continued reduction in the use of natural gas in (mainly decentralised) electricity production through cogeneration and reduced natural gas demand for heating buildings. Consumption of coal will continue to decrease beyond 2020 and the remaining consumption of coal for electricity production is expected to cease in 2030.

For the time being, oil retains its dominant role as fuel in transport and as a raw material in the chemical industry. Oil consumption remains roughly the same. In the adopted policy scenario, there are no new investments in nuclear energy and the Borssele nuclear power plant will close in 2033. The contribution of renewable sources is expected to increase further in the coming years, in particular due to the growth of renewable electricity production (see paragraph 4.2.2).

Final energy consumption decreases further

Final energy consumption increased again until 2018, probably as a result of the pick-up economy. There was a slight decrease in 2019, followed by a sharp decrease in 2020 and 2021 due to the coronavirus pandemic and a low level in 2022 due to the high energy prices caused by the energy crisis. A further downward trend is projected in the projection. Final energy consumption is expected to fall further to 1.872 petajoules in 2 030 in the policy variant “adopted policies”, well above the target consumption of 1.609 petajoules in 2030. The further decrease is mainly due to reduced heat consumption in the built environment driven by demolition, new construction, energy saving measures. Final energy consumption is expected to fall further to 1.800 petajoules in the policy variant with adopted policies alone in 2040. Uncertainty about the size of economic activities and the evolution of energy prices are important factors that may lead to higher or lower expected energy consumption.

The expected final consumption in the built environment is decreasing mainly by increasing insulation measures, efficiency measures and increasing the number of heat pumps. In industry, final consumption is projected to remain the same on balance, but consumption of natural gas is expected to decline and electricity consumption is increasing. The increase in electricity consumption is due to the deployment of electric boilers, industrial heat pumps, CCS installations and the production of hydrogen through electrolysis. The role of fossil fired CHP plants in particular is diminishing due to the input of alternative heat production, for example by biofeedstock boilers and electrification of heat supply.

The decline in natural gas consumption is strongly dependent on energy prices. The estimate shows a slight increase in non-energy consumption. This development is mainly related to limited growth in the petrochemical industry (CE Delft, 2021), but this volume effect is uncertain. Final energy consumption for traffic and transport (including international aviation) is more than 6 % lower than the 2030 pre-coronavirus level in 2019. This decrease is mainly due to the fact that the use of energy in electric vehicles is more efficient than in fuelled vehicles.

In agriculture, final consumption is falling mainly due to savings and increased sustainability of energy consumption.

Expected energy savings well above the objective of Article 7 EED for 2014-2020

Article 7 of the 2018 European Energy Efficiency Directive (EED) required the Netherlands to achieve 482 petajoules cumulative energy savings in the period 2014 to 2020. Only savings attributable to Dutch policy were included. With the implementation of the MJA/MEE, EIA and the policy in the built environment, 672 petajoules have been saved during this period and this objective has been largely achieved.

For the period 2021 to 2030, cumulative energy savings of 1.285 petajoules in final terms, based on Article 8 (formerly Article 7) of the 2023 revised EED (seesection 2.2). No estimates have been made for these cumulative energy savings on the basis of the policy variant with defined policies (see paragraph 5.2for estimation with adopted and planned policies). However, the KEV2023 estimated the expected cumulative energy savings on the basis of the policy that was known and passed on as of 1 May 2023 (see paragraph 5.1).

III Developments and potential for cogeneration and district heating and cooling

Production with combined heat and power

Until 2010, the use of CHP installations by final consumers increased: for example, between 2005 and 2010, greenhouse horticulture capacity increased from over 1.200 to 3.000 megawatts of installed electrical power (KEV2022). The period 2012-2016 was characterised by a less favourable situation for CHP installations: the difference between the selling price of electricity and the purchase price of gas decreased during that period. In the last after 2016, this ratio turned out to be more favourable; this did not lead to an increase in the power of final consumers, but to a further increase in the number of hours of rotation of the CHP installations. 51 % of the heat and electricity supplied by final consumers is produced from natural gas, and in particular from the fuels waste, process gas and a small proportion of coal.

Sharp decrease in 2022

High natural gas prices in 2022 significantly reduced the use of natural gas in greenhouse horticulture, both in CHP plants and in boilers. Electricity production for own consumption decreased more in CHP plants than production for feed-in to the grid. This was because the *spark spread* was often still sufficiently favourable to return electricity to the grid (PBL, 2023a). In addition, electricity demand in glasshouse horticulture decreased by over 30 % in 2022, mainly due to less visibility and other savings.

Expected decrease in CHP in the coming years

In the policy variant with adopted policies alone, a small increase in capital is expected from 2022 onwards due to favourable feed-in *spark spread*. This is more positive in greenhouse horticulture than for industry. In agriculture, gas engines are mainly used, while in industry, steam and gas turbines are mainly designed with different characteristics. However, for both industry and glasshouse horticulture, the number of rotary hours is expected to fall in direction 2030 with a fairly constant capacity of CHP installations.

District heating has a small share of the Netherlands

The share of dwellings connected to heat networks is increasing in the Netherlands. In 2022, according to preliminary figures, 6.7 % of dwellings were connected to heat networks (CBS, 2024e). The number of connections has increased since 2010 (4.6 %), mainly due to a number of major new building projects. The supply of heat to households increased from 8 petajoules in 2000 to 13 petajoules in 2021. In 2030, this will have increased further to around 16 petajoules according to established policies (KEV2022).

Several industrial sites also have a heat network. This involves steam production, usually from CHP. In total, this was 62 petajoules in 2021 (CBS based on EED District Heating Reporting to Eurostat). There is little visibility of these networks and their development. Some further growth is expected to occur here due to various industrial heat exchange initiatives.

IV Development of energy performance requirements in the built environment

Historical development of energy performance requirements built environment

In December 1995, the energy performance standard for new construction was introduced in the Netherlands and requirements for the minimum energy performance of a new building, known as the Energy Performance of the EPC, were included in the building regulations.

The EPC represents the building bound energy consumption. This consumption refers to heating, hot water supply, ventilation, lighting and possible cooling of a building, based on a standard occupant/user. This does not include the energy consumption used for e.g. cooking, washing and TV viewing. In addition, it is based on a standardised outdoor climate and standardised consumption of the building. The height of the EPC requirements for non-residential buildings depends on the building function. For example, a distinction is made between a teaching and an office post.

In the period from 1 995 to 2015, the EPC requirements have been tightened several times, encouraging energy savings while ensuring that the measures are technically and financially feasible for all buildings. In this way, in line with the European Energy Performance of Buildings Directive (EPBD), cost-effective and cost-option policies are pursued within the built environment.

New methodology and energy performance requirements built environment

In June 2019, the new methodology to determine the energy performance of buildings, the NTA 8800, was published and designated in the building regulations as of 1 January 2021. This methodology makes it possible to determine the energy performance for both the existing construction (in the case of renovation) and for new buildings. The energy labels of dwellings and buildings are also generated on the basis of the NTA 8800 and the recording protocols.

For all new buildings, both residential and non-residential, the environmental permit application will have to comply with the requirements for nearly zero-energy buildings (the so-called NZEB requirements and the Tojuli requirement) as of 1 January 2021. NZEB derives from the Energy Agreement for Sustainable Growth and from the EPBD. The energy performance is determined on the basis of three indicators:

1. The energy demand in kilowatt-hour per m^2 area of use per year;
2. Primary fossil energy use in kilowatt-hour per m^2 use area per year;
3. The share of renewable energy as a percentage.

For the purposes of existing construction, the building regulations lay down, inter alia, requirements in the situation of:

- Cultivation (partial renewal, modification or extension of a building);
- Renewal or replacement of insulation layers;

- Renewal or replacement of windows, doors and frames;
- Major renovation;
- Construction with adaptation of the technical building system (installation).

Expected developments in energy performance built environment

The EPBD II (2010/31/EU) requires Member States to report every five years on the cost-optimal nature of the minimum energy performance requirements applicable within the built environment. In accordance with the European Regulation (244/2012), the requirements should be strengthened if the cost-optimal level of the situations examined for which building regulations impose requirements deviate by more than 15 % from those laid down. The studies for this purpose were finalised at the end of 2023 and the strengthening opinions were prepared by RVO. It is expected that in 2024, also on the basis of the obligations stemming from the revised EPBD (IV) agreed in 2024, the Ministry of the Interior will decide on the possible tightening of energy performance requirements in 2025.

4.4 Dimension energy security

As discussed in section 4.2, the energy mix is expected to change in the current decade.
The use of natural gas and coal will decrease, while the use of renewable sources will increase. The extraction of natural gas is being largely phased out and the war in Ukraine is leading to further diversification of (imported) energy sources. The (international) transmission of electricity will increase, driven by growth in the production of RES-E. This will require adjustments to the electricity and gas network (see paragraph 4.5). This section discusses trends and projections per energy carrier.

I Security of Supply of Natural Gas

The Netherlands has substantial natural gas reserves which have been extracted on a large scale since the 70s, both to meet domestic gas demand and to export. Most Dutch natural gas is located in the Groningen field. Annual combined gas production from the Groningen field and the small fields fluctuated around 80 billion cubic metres (bcm), but from 2015 onwards, the restrictions on extraction from the Groningen field and reduced supply from small fields (PBL, 2022a). Due to the risk of earthquake in Groningen, it was decided in 2019 to put an end to extraction from the Groningen field as soon as it is justified, with the extraction volume determined annually. For the gas year 2021-2022, the maximum gas extraction was set at 4.5 billion cubic metres, and for the 2022-2023 gas year it was 2.8 billion cubic metres. For the gas year 2023-2024, there was in principle no gas from Groningen. It was only in very special situations that it remained possible to extract a small amount of gas at the remaining 11 production sites.159 As of 19 April 2024, the Groningen field was definitively closed.

In order to achieve the planned phase-out of the extraction of low calorific natural gas from Groningen, measures have been taken to produce more low-calorific gas from high calorific gas and temporarily store it underground, to phase out exports of low-calorific gas and to switch large consumers to high-calorific gas.

As a result of the decision to completely phase out gas extraction from the Groningenveld, the Netherlands has been a net importer of natural gas since 2018. The Netherlands imported gaseous gas in 202 240.2 billion cubic metres (CBS, 2024f); this represents a decrease of 10.1 % compared to 2021.

The Netherlands also exported 2 022 billion cubic metres of natural gas through pipelines in 38,4, whether or not after regasification of liquefied natural gas (LNG); this is 3.3 % less than in 2021. LNG imports increased sharply: in 2021, 18.8 billion cubic metres of liquefied gas were imported, compared to 9,8 bcm in 2021 (CBS, 2024f). The Netherlands also exported about 0.6 billion cubic metres of LNG in 2022 (CBS, 2024f). Following Russia's invasion of Ukraine, the Netherlands decided in early 2022 to work towards independence from Russian gas imports as soon as possible.

Since the end of 2021, gas storage in the Netherlands has been very interested, with concerns about sufficient gas supply in times of high demand. Annual gas storage imports into Dutch soil amounted to 20 216.8 billion cubic metres and returned 11,6 bcm. The Netherlands owned two underground storage sites for high-calorific gas (Bergermeer and Grijpskerk), but in 2021 Grijskerk was converted to a low calorific gas storage and was put into operation as such in 2022. This comes with the three existing low calorific gas surcharges (Norg, Zuidwending and Alkmaar). The total underground gas storage in the Netherlands has a volume of 14.9 billion cubic metres, with Norg being the largest storage with a maximum storage capacity of 6 bcm (PBL, 2022a).Since 2022, a sixth gas storage at Nüttermoor, Germany, has been excluded from the Dutch market. In addition, some (L-gas) cavernes are connected to the Dutch network in Epe (Germany).

These gas storages together have sufficient storage and withdrawal capacity to currently provide the main functions of seasonal storage, peak supply and balancing of the grid by market participants (EZK, 2023a).

159 Phasing out Groningen | gas extraction in Groningen | Rijksoverheid.nl.

II Coal supply security

Coal is used in the Netherlands for electricity generation and steel production. Coal mining has ceased in the Netherlands since the 70s, despite the presence of its own reserves. The Netherlands is therefore entirely dependent on imports for coal. Coal imports in 2021 and 2022 amounted to around 9 megatons (CBS, 2 024 g), with which the Netherlands is one of the largest coal importers in the EU. Much of the coal is re-exported to other European countries. There are few concerns about security of supply for coal as it is widely available on several continents. In 2022, coal (and other solid fossil fuels) originated mainly from the United States (30 %), South Africa (21 %) and Australia (18 %) (Eurostat, 2024).

Coal consumption increased by more than one third after three new coal-fired power stations were commissioned between 2013 and 2015, before falling significantly to 172 petajoules in 2020 and 231 petajoules in 2022 (PBL, 2023a). The first phase of this decrease was due to the closure of five older coal-fired power plants. Thereafter, the deterioration in the competitive position of the coal-fired power plants in relation to the gas power stations (especially in 2020) and the increase in the mastery of bio-raw materials and the temporary shutdown of the Onyx coal-fired power plant on the Maasvlakte from 2020 onwards.

Due to the production cap for coal-fired power plants and the high price of CO2in the European Emissions Trading System (ETS), coal consumption will remain low in the coming years. The majority of bio-raw materials will also reduce coal consumption in the coming years. Coal consumption is estimated to decrease sharply in 2030, as it is no longer allowed to generate electricity from coal as of that year. Most of the remaining coal consumption (3 % of primary consumption) is on the steel industry. This further reduces import dependency on coal.160

III Petroleum security of supply

The Netherlands imported 103 megatone of petroleum and gas condensate (CBS, 2024h) in 2023. The main countries of origin were the United States (21 %), Norway (14 %) and the United Kingdom (11 %).
The countries of origin of the oil changed significantly in the course of 2022. For example, the loss of Russian crude oil at the end of 2022 was compensated by additional imports from Saudi Arabia, Iraq and Kazakhstan (CBS, 2023f). Half of the imports are directly exported to other countries such as Germany and Belgium. The other half is consumed by the refineries in the Netherlands.

Dutch refineries have an international outlet, in particular within North-West Europe, but to a lesser extent also intercontinental, mainly in Atlantic countries. Demand for oil products is expected to decrease further in developed economies, such as in North-West Europe, and this is also putting economic pressure on refineries (IEA, 2021). Part of this pressure is collected by distilling as many quality products as possible and placing on the market as little residual oil as possible.

Asa result of EU sanctions, imports of Russian crude oil and oil products into the EU have now almost ceased, with the exception of a number of countries that still benefit from specific exceptions. A price cap has also been introduced and restrictions have been put in place for Western services for the transportation of Russian oil to other parts of the world. European parties have found new suppliers of oil and oil products, global trade flows have shifted and there has been no shortage of oil or oil products. The price has also remained stable, and even slightly decreased, which has contributed to reductions in OPEC + production. Moreover, Russian oil may still enter the European market through processed products and this is not prohibited under the current sanctions.

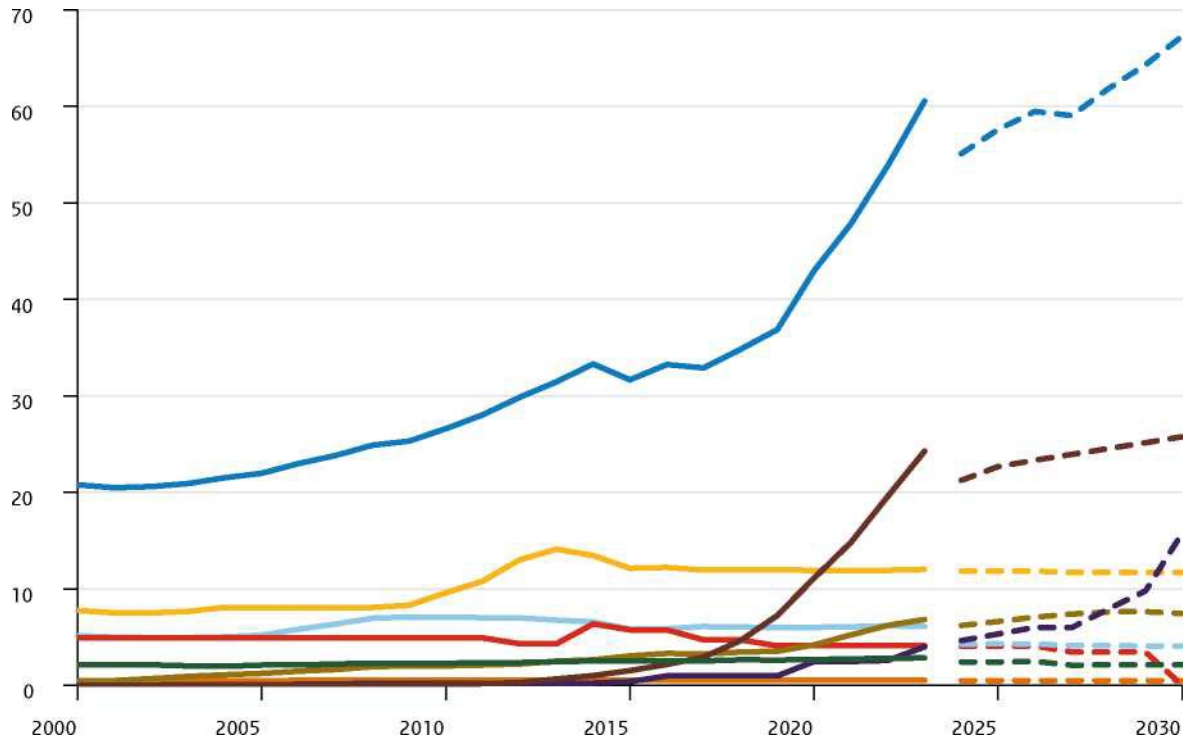
IV Security of Supply of Electricity

Domestic production capacity in the Netherlands increased from almost 21 gigawatts in 2000 to 61 gigawatt in 2023 (CBS, 2024i). Coal capacity is shrinking sharply with the forthcoming ban on coal roasting in the Netherlands
(the Amercentrale is no longer allowed to use coal for electricity production in 2025, and will follow the Rotterdam, Eemshaven and Onyx power stations in 2030). Wind and solar power, on the other hand, increased sharply and, according to the KEV2022, increases further to 2030 with adopted policies alone (see Figure 4.10). In addition, demand for other sources is increasing, such as electricity demand for electric vehicles or for heat in industry and storage in batteries. The gas-fired power was over 2 023 gigawatts in 12; this remains broadly the same in the policy variant with adopted policies only until 2030.

160

Figure 4.10 Optional electrical power (with defined policy) (Sources: CBS, 2024i (realisation), PBL (projection); in PBL,

Parliamentary paper 30196, No 567.



2022a)

Gigawatt

Others consist of installations with the primary energy carriers: fossil fuels centrally and decentralised other than coal and natural gas, waste, hydropower, biomass, steam, gas expansion, batteries ≥ 1MWh.

Total electricity production decreased by 2 021 terawatt-hours in 2, despite a limited increase in demand of 0.6 terawatt-hours compared to 2020. Electricity imports and exports in the Netherlands were almost balanced in 2021, while in 2020 there was still a net export of 2.7 terawatt hours. In the longer term, the Netherlands is expected to be net exporter on an annual basis (PBL, 2022a). This is due, inter alia, to the withdrawal of nuclear power plants in Germany and Belgium and the reduction of the capacity of coal and lignite power plants in Germany.

Until 2025, there is sufficient domestic generation capacity in the Netherlands to meet national electricity demand, and extreme weather and exit scenarios are not expected to exceed the Loss of Load Expectation (this standard is subject to a maximum of 4 hours per year with a partial shortage of electricity supply compared to demand). Security of supply is thus at a very high level (TenneT, 2023a).

However, in the medium term, uncertainties are increasing. This is due to further electrification of society, a further decrease in operational thermal capacity and an increase in the share of renewable generation with variable production, making the system increasingly resilient.

Total
"■ ■ ■ MM" Natural gas decentralised
MMMBM Steenkool
Wind at sea Other
MMMBM Natural gas central
■ MMBM' Nuclear
Wind on land Son
Realisation
Estimated policy adopted

From 2030 onwards, security of supply decreases (compared to previous scenarios) and the baseline is exceeded by a LOLE of 4.5 hours per year. This is despite the expectation of an increase in the available flexibility due to increased battery capacity. The decline in security of supply is almost entirely caused by an acceleration of the decrease in available flexibility in the surrounding countries, in particular by additional decommissioning of conventional power and increasing electricity demand.

4.5 Internal energy market dimension

I Electricity interconnectivity

I Current interconnectivity

An important aspect of the integrated electricity market is the development of network connections between countries, known as interconnectors. Currently, the Netherlands has connections with Germany, Belgium, Great Britain, Norway and Denmark with a total import/export capacity of 9.1 gigawatt in 2020 (TenneT, 2023a). Table 4.9 shows estimates of interconnection capacity for the coming years.

Table 4.9 The Netherlands interconnection capacity in gigawatt (Source: TenneT, 2024a)

Border with NL	Maximum exchange [GW]		
	2028	2030	2033
DK	0,7	0,7	0,7
NLLL[a]	N/A	N/A	2,0
NO	0,7	0,7	0,7
UK	1,0	1,0	1,0
Core[b]	10,0	11,5	13,3
Total[c]	12,2	13,0	15,6

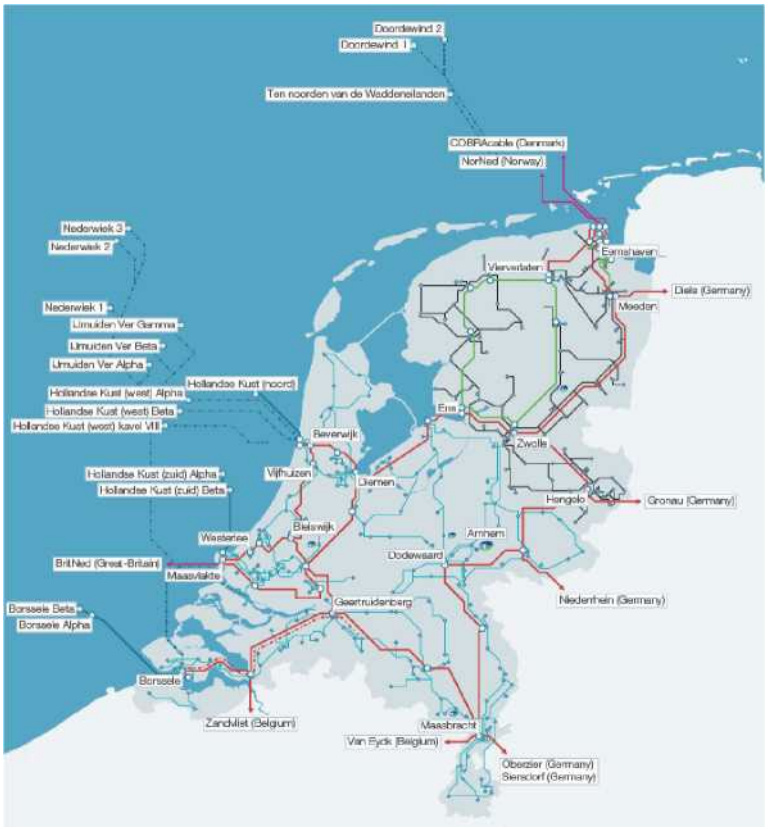
[a] *The Hybride LionLink interconnector between the Netherlands and UK is modelled as its own offshore market zone NLLL, the direct capacity between the Netherlands and UK is added.*

[b] *The exchanges with the CORE area concern market exchanges with the AC network connected to the Netherlands and thus cover connections with Germany and Belgium. Total contains maximum actual simultaneous power on all interconnectors.*

[c] *Total is the maximum import power realised in the market simulations.*

The electricity markets of Belgium, France and the Netherlands have been integrated since 2008. Later, the markets of Germany (since 2010) and the United Kingdom (since 2014) were also linked to the Dutch market. Links with this regional market have also been made with the Scandinavian and central European markets (TenneT, 2018). This creates a highly integrated (north-west) European electricity market in which the Netherlands plays an important pivotal role. This integration contributes to competition in the energy market, enhances security of supply and facilitates the uptake of renewable electricity. Indeed, with a high degree of interconnectedness, national surpluses or shortages of electricity can be absorbed more easily. Figure 4.11 shows the transmission network.

Figure 4.11 Transmission Network and Interconnectors (Source: TenneT,



Onshore 380 kV connection
□ Onshore 380 kV interconnector
Onshore connection 380 kV in planning phase/under construction
Onshore 220 kV connection
Onshore 150 kV connection
Onshore 110 kV connection
Offshore connection
Offshore connection in planning phase/under construction
□ Offshore DC cable
o Onshore station (s) or converter station
Onshore Station/More Conversion Station in planning phase/under construction
• Onshore coverter station on stern
o Onshore sub-station
TenneT office

No rights can be derived from this map.
31 December 2023

II Expected expansions of interconnectivity

Electricity connections with Germany and Belgium are increasing

Currently, the Netherlands has direct connections with Germany, Belgium, Great Britain, Norway and Denmark. Due to enlargements, this increases from 9,1 to 10.8 gigawatts in 2030. There are no concrete enlargement plans for the connections with Norway, Denmark and Great Britain. Between the Netherlands and Denmark, the COBRA 2 019 megawatt cable became operational in 700. The capacity between Belgium and the Netherlands increases from 2 to 3.4 gigawatts for 2025 due to the delivery of the Rilland transformer station, the installation of an additional transverse regulator at Maaseik in Belgium and internal reinforcements in the Belgian network to close the Doel nuclear power plant.

Following the decision of the European Council of 23 October 2014 to have 2020 10 % European interconnectivity in 2020 and

2030 15 % by 2020, the *European Commission set up an expert* group which, on 15 November 2017, issued a report on the expected European interconnection capacity needed until 2030. This report cites two new ways of measuring interconnectivity, with the Netherlands achieving the targets broadly with both alternative measurement methods (EC, 2017a). Table 4.10 shows the percentages of interconnectivity based on the definition used by the European Commission (EC, 2017b). On the basis of this definition too, the Netherlands is meeting the objectives.

Table 4.10 Interconnections, electricity generation and interconnectivity (Sources of electricity generation capacity: PBL, 2022a (projection with defined policy))

	2019	2020	2025	2030
Total capacity interconnections (GW)	7,1	9,1	9,8	10,8
Electricity generation capacity (GWe)	37,1	43,1	57,6	67,4
Interconnectivity (%)	19.1 %	21.1 %	17.0 %	16.0 %

Developments in gas network connections

Following the earthquake in January 2018 near Zeerijp, the Minister of Economic Affairs decided to end gas extraction from the Groningen field. As of 19 April 2024, the Groningen field was definitively closed. There are currently no plans to substantially expand the gas network. However, in the long run, parts of the low calorific natural gas network can be made suitable for the transport of high calorific natural gas, hydrogen or green gas, as a result of the phasing out of low-calorific gas and the possible increase in the use of high calorific natural gas, hydrogen and green gas.

The last investment plan of the operator of the national gas transmission network (TSG, 2023) provides for investments in the conversion of gas storage from H-gas to L-gas and the extension of nitrogen capacity through the construction of the nitrous installation Zuidbroek and the conversion G-H gas for the period up to 2025.

There are currently no plans to expand connections to the gas network.

II Energy transmission infrastructure

I Characteristics of existing transmission infrastructure

Electricity grid size and voltage level

The high voltage grid connects the additional high-voltage grid to the distribution networks. The high-voltage grid includes power plants, energy-intensive industry and larger wind farms (35 to 500 MW). The high-voltage grid consists mainly of networks with a voltage level of 50 kilovolts, 110 kilovolts or 150 kilovolts, with networks with the last two abovementioned voltage levels being operated by TenneT since 1 January 2008. The high-voltage grid consists of approximately 10.000 kilometres of overhead line and underground cables. Furthermore, there are high voltage cables at 220 kV and 380 kV, which are formally referred to as the interconnected system. Figure 4.12 shows the 220 kV connections on the left side of the (light) green, including links to wind at sea projects.

The 380 kV interconnection network is in red in the middle. To the right of the purple, interconnections to other countries are shown, the HVDC networks, ranging from 300 kV to 450 kV.

Figure 4.12. Network map of the 380 kV and 220 kV networks per 1-1-2024 (Source:

Transmission network natural gas

The transmission networks operated by Gasunie Transport Services (GTS) consist of pipelines and stations.
The transmission networks are divided into a main pipeline network (HTL) and a regional transmission system (RTL) according to pressure class. The HTL is divided into a Groningen gas (G-gas) transmission network and a high-calorific gas transmission network based on the gas type flowing through the grid (see Figure 4.13).

Figure 4.13 High calorific gas transmission network (yellow) and Groningen gas (black) (Source: CTS, 2023)

TheHTL networks are interconnected via blending stations, where different combinations of H-gas and nitrogen are added to the G gas network. The HTL networks contain a large number of compressor stations in addition to pipelines. Through these stations, the gas in pressure may be increased to allow further transport. Gas is fed on HTL at entry points. These may include supply points for gas from domestic production, border points entering gas from other networks (or via an LNG terminal) and points connected to gas storage facilities. Gas can be fed through connections with Germany and Belgium and in the form of LNG on the Maasvlakte (the GATE LNG terminal). A connection via the Bacton Balgzand Line (BBL) was made possible from the United Kingdom, with a capacity of 20 600 000 kWh/h (About BBL' BBL Company).

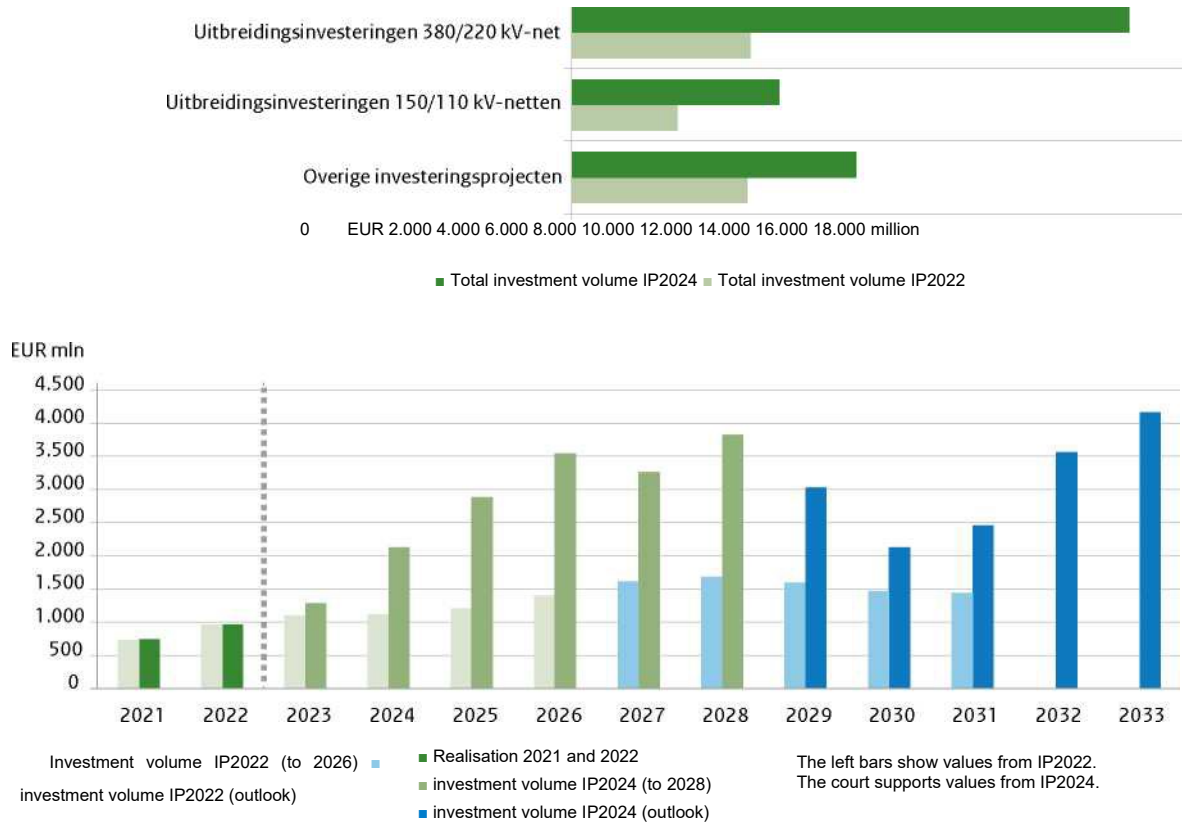
After transport, gas is extracted from the HTL at exit points or at monitoring and control stations. Exit points are the transhipment points for domestic customers (the gas reception stations), border points where gas is transferred to other networks and points connected to gas storage facilities. The RTL starts with a monitoring and control station where the HTL gas is fed and, in turn, the regional network operators' networks are supplied to a large extent by exits on the RTL. The RTL is used almost exclusively for the transport of G gas.

II Expected extension of transmission infrastructure

Electricity transmission grid developments

The Netherlands has one of the most reliable national electricity grids in the world with a reliability of 99.99 % (Netherlands Network Management, 2023). In order to fully serve the electricity market and maintain a reliable supply of energy, the capacity of the high-voltage grid will be increased in the coming years.

Figure 4.14 Total investment volume from 2022 to 2033, comparing the investment plan in 2022. (Source: TenneT, 2024b)

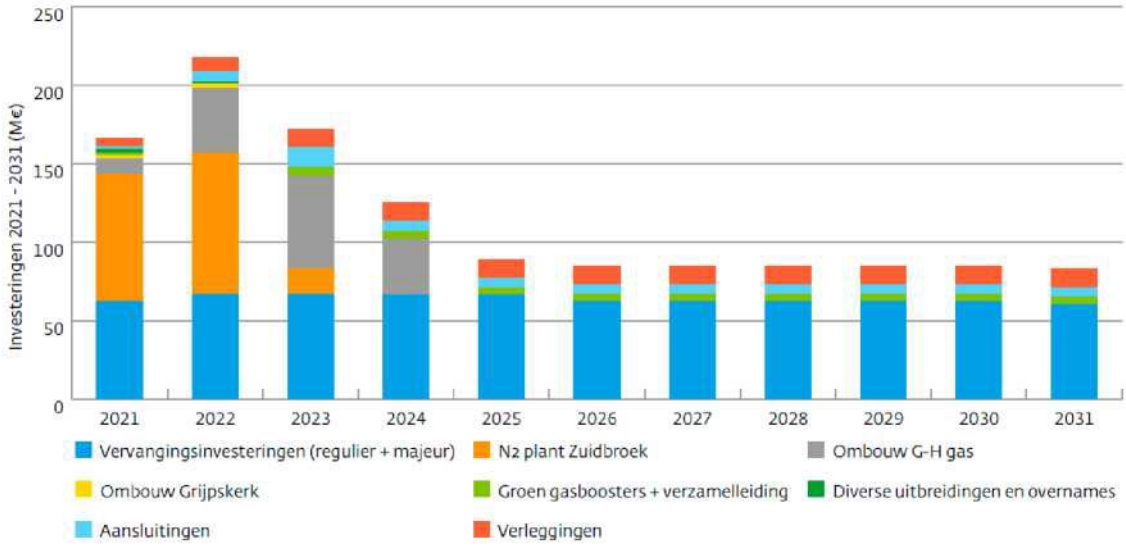


Developments in transmission network natural gas

TSG prepares a biennial investment plan (IP), the most recent one being the IP 2024 mentioned above (see also above).

Domestic production is declining faster than declining domestic gas demand. It is therefore clear that additional imports are needed to compensate for the falling Groningen production. The additional imports are no longer filled in by Russian gas, due to the invasion of Ukraine and the international sanctions in place. However, LNG can be imported via Gate Terminal and/or Belgium and is more imported from the US.

Figure 4.15 Total investment TSG (Source: CTS, 2023)



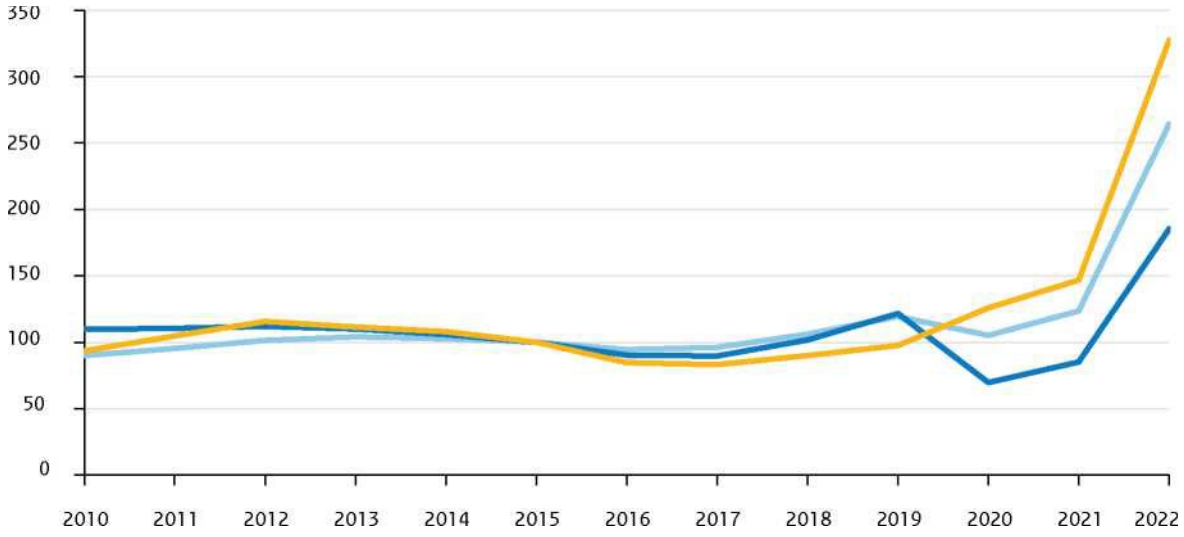
III Electricity and gas markets and prices

I Trends in energy markets and prices

Energy prices for final consumers

The Consumer Price Index (CPI) energy reflects the evolution of the price of natural gas and electricity consumption by households (see Figure 4.16). Household energy bills have increased by 9.5 % per year on average since 2000, while inflation is at an annual average of 2.2 %. The relatively large increase in energy prices for households is driven by the large increases in 2020 and 2021. The CPI energy fell sharply during the crisis at the end of 2008, before reaching a provisional ceiling in early 2013. Since then, there has been a significant decrease (CBS, 2 023 g).

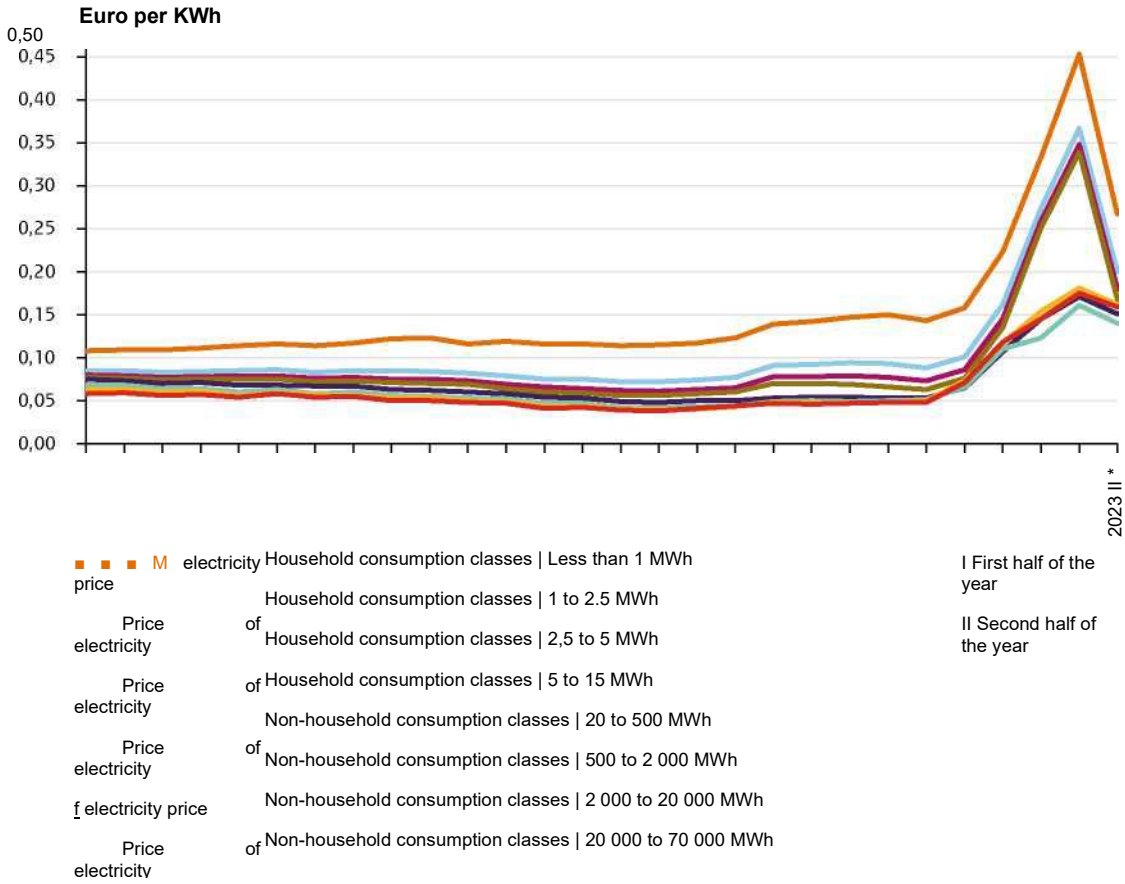
Figure 4.16 Consumer Price Index (CPI) Energy, Electricity and Gas (Source: CBS, 2 023 g; CBS, 2023h)



Electricity price for final consumers

The electricity price depends, inter alia, on the fuel prices of oil, coal and natural gas (see Figure 4.17). Another important component is the cost of transmission and distribution networks.
The war in Ukraine and has increased the prices of all final consumers.

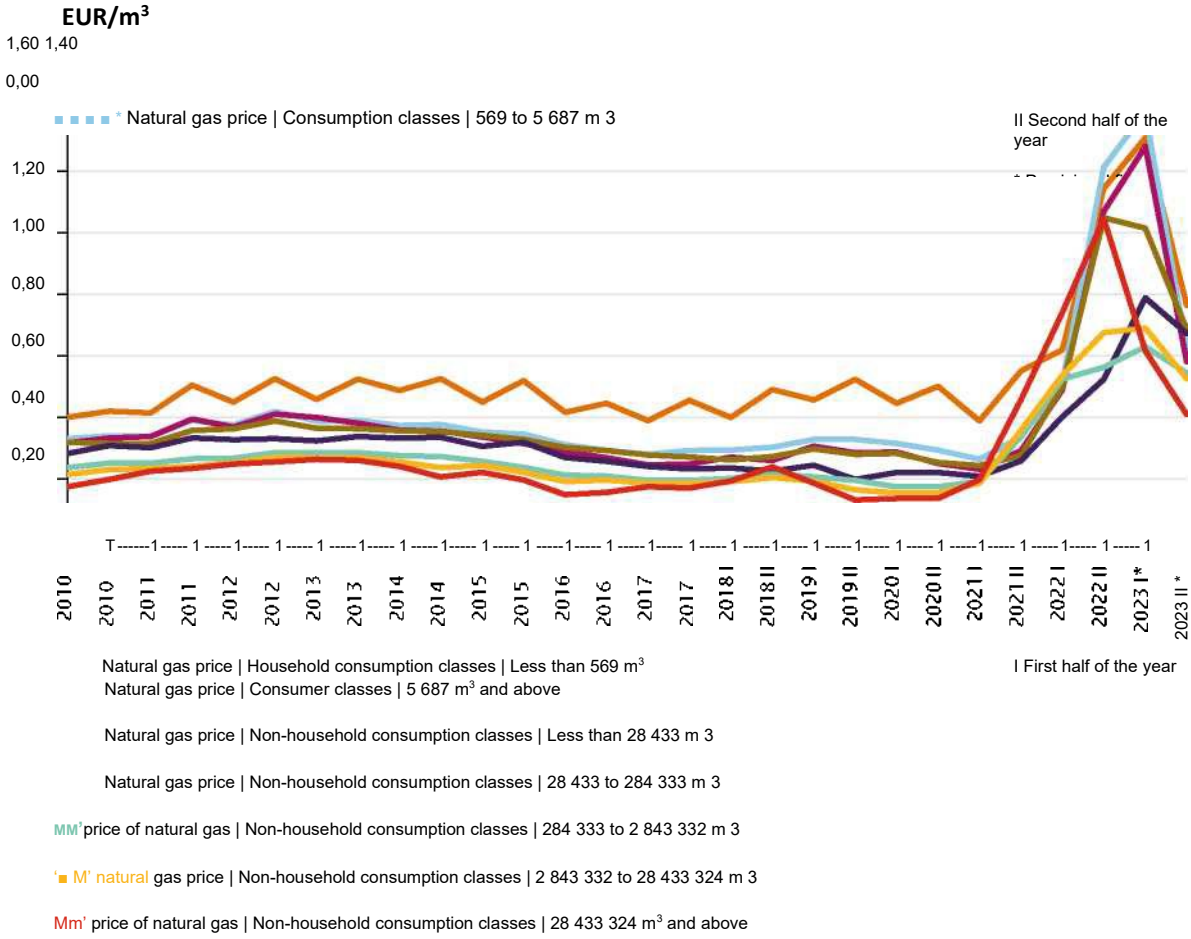
Figure 4.17 electricity price for final consumers, half-year data (Source: CBS, 2023i)



Natural gas price for final consumers

Figure 4.18 shows the evolution of the price of natural gas for final consumers from 2010 onwards. In general, the price of natural gas follows the price of crude oil. Price fluctuations for households within a year are driven by strong demand for natural gas during the winter period. Important world events also have an impact on the price of natural gas, such as the Russian invasion of Ukraine in particular.

Figure 4.18 Gas Price for final consumers, half-year data (Source: CBS 2023i)



II Project electricity market developments

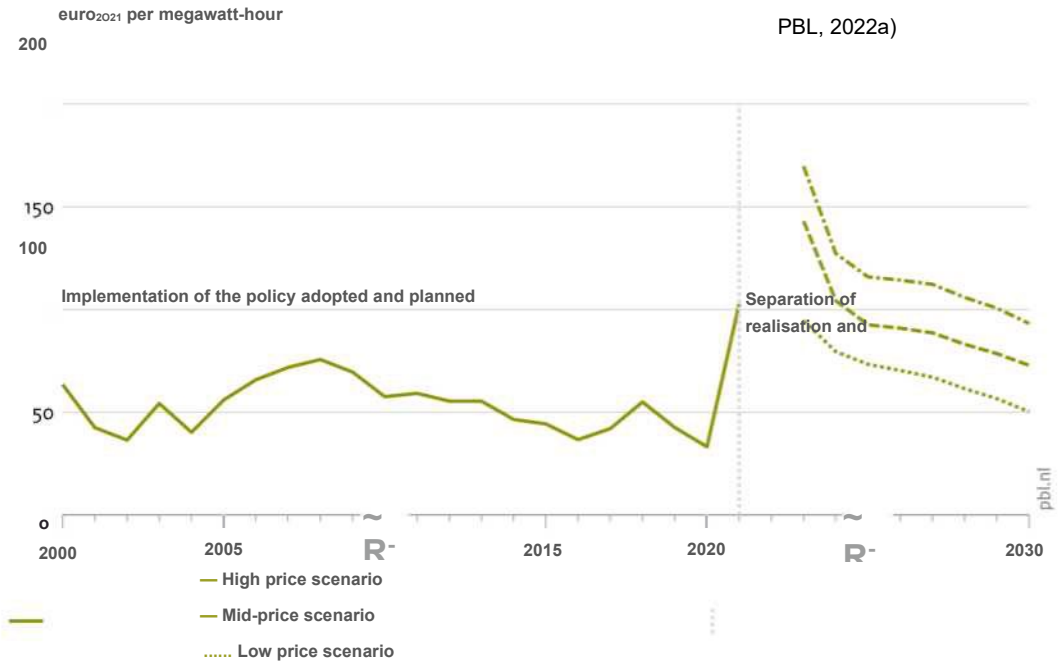
The average electricity price in 2021 was more than three times higher than in 2020, with an average day-ahead price of EUR 103 per megawatt-hour (Source CBS, 2024c). This high price is linked to the sharp rise in gas and coal prices. The electricity price increased further in early 2022 following the Russian invasion of Ukraine due to the steep further increase in gas and coal prices to a record high of over EUR 240 per megawatt-hour. In 2023, a fall to an annual average price of EUR 96 per megawatt hour is visible.

For the electricity sector, several possible future developments are conceivable, with no one specific scenario that is most likely. One reason for this is the high degree of uncertainty in the evolution of electricity demand and supply abroad. Indeed, the Dutch electricity market is highly integrated into the North-West European market. In addition, the evolution of fuel and CO2prices is uncertain; changes in relative prices (including in the short term) may have a significant impact on the market position of the Dutch coal and gas power plants and thus on the import and export of electricity. In addition,

occasional developments, such as soaring prices due to the war in Ukraine, plant failures such as the current low availability of nuclear power plants in France, and the impact of the weather on hydropower, wind and solar electricity, also having a major impact on electricity trade between countries, and thus on electricity generation in the Netherlands.

Despite uncertainty about future electricity production, there are some trends to be identified. A first trend is that electricity generation from coal and gas is declining over the whole bandwidth in the long term. The main reasons for this decreasing trend are the ban on coal in electricity production in 2030 and the increase in renewable electricity generation in both the Netherlands and other countries. In addition, transport capacity between the Netherlands and neighbouring countries is increasing (interconnection), giving more scope for the exchange of electricity between countries. This means that less conventional production is needed in a country to absorb periods of low renewable production, as these periods and the demand peaks do not coincide in all connected countries.

Figure 4.19 Evolution of the average wholesale electricity price (Source



PBL, 2022a)

Source: CBs (realisation); KEV Estimates 2022

Figure 4.19 shows the expected wholesale price according to the KEV2022 in the Netherlands for three scenarios. For these price scenarios electricity prices have also been calculated using fuel and CO2prices in three scenarios. The assumptions on the evolution of fuel and CO2prices are based on European Commission figures. These assumptions determine to a large extent the evolution of the electricity price, other price developments for coal, gas and CO2 will lead to other electricity prices. In the high price scenario, the electricity price to 2030 is EUR 93 per megawatt-hour. In the low price scenario, the electricity price becomes EUR 203 050 per megawatt-hour.

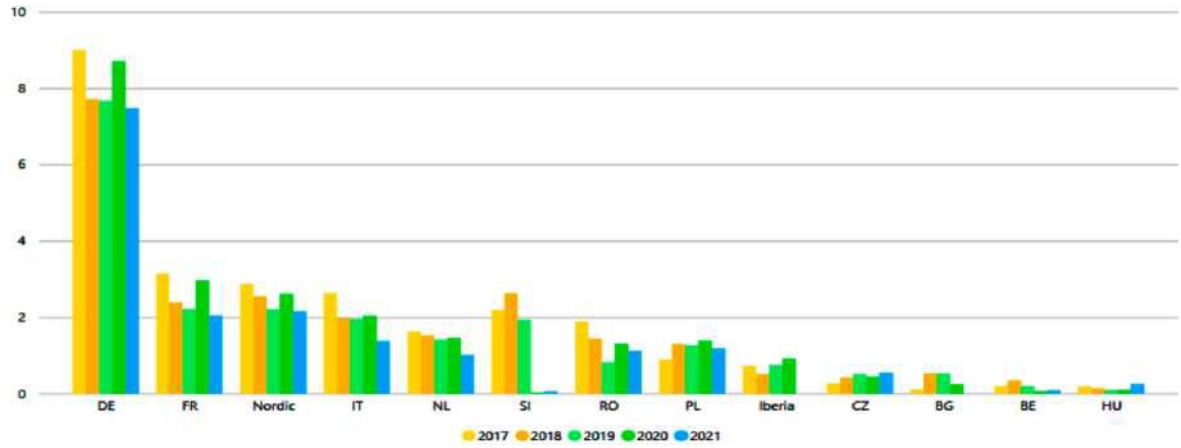
IV Operation of the electricity and gas markets

This section provides a better understanding of the functioning of the energy markets in the Netherlands based on quantitative data. The annual reports prepared by the Agency for the Cooperation of Energy Regulators (ACER) on the results of the monitoring of the internal market in electricity and gas have been used. ACER, in cooperation with national regulators, prepares reports on wholesale markets, retail markets and consumer protection in Europe.161 These reports address, inter alia, developments in supply and demand, prices and liquidity of energy markets. For the sake of brevity, the liquidity of wholesale gas and electricity markets and some indicators of "market health" in wholesale gas are explained here. For comprehensive information on the availability of cross-border capacity and its efficient use, reference is made to the reports themselves.

The liquidity of the wholesale electricity market

Liquidity can be measured in different ways. The 'churn factor' is the volume traded through exchanges and intermediaries in relation to physical consumption. The higher this factor, the higher the liquidity. In the Netherlands, churn factor decreased by around 30 % between 2017 and 2021 (see Figure 4.20). The decrease could be explained by the fact that a correction has been made for an increase caused by the coronavirus pandemic in 2020 and the focus on a shorter horizon.

Figure 4.20 churn factors in key European forward markets 2017-2021 (source: ACER/CESR, 2022a).

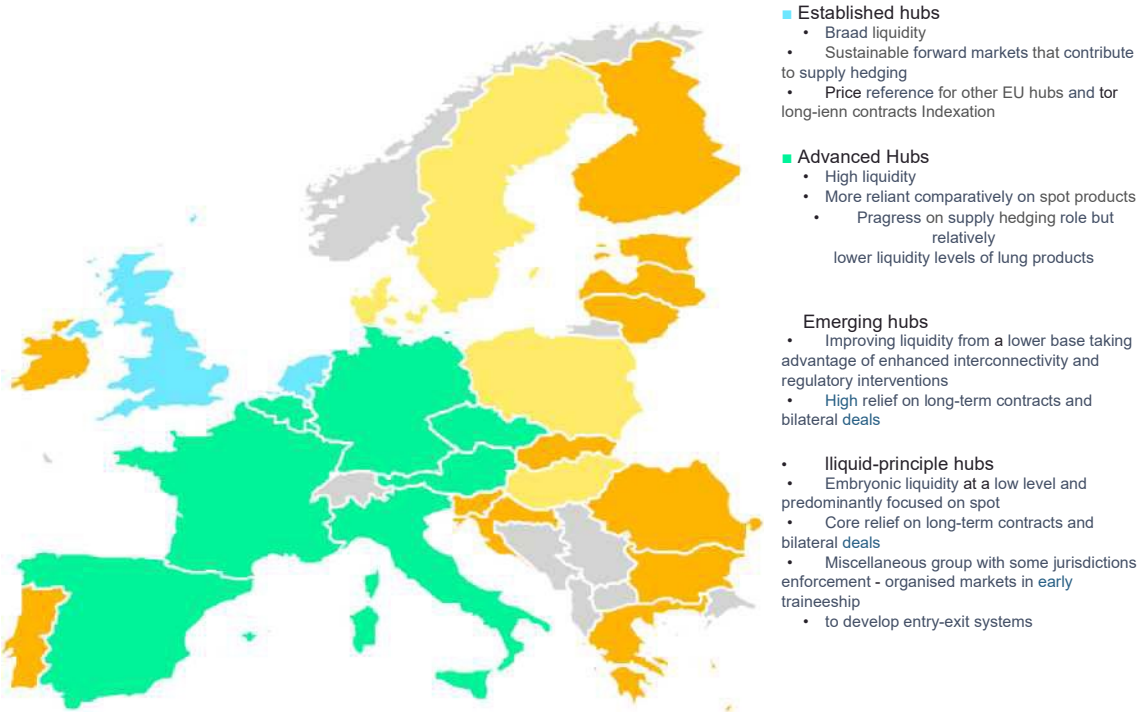


161https://www.ceer.eu/eer_publications/mmr_-_national_reports.

The liquidity of the wholesale natural gas market

The Dutch gas market, as an established hub, belongs to the highest category of hubs with broad liquidity, large forward markets that contribute to the possibilities to hedge supply risks and serves as a reference price for other hubs in the European Union and for indexing long-term contracts (see Figure 4.21).

Figure 4.21 Hubs ranking in the EU based on 2021 monitoring data (Source: ACER/CESR, 2022b)



Source: ACER based on AGTM Metric results

The Dutch market for Title Transfer Facilities (TTF) for day-ahead (DA) gas is the largest in the EU. Between 2019 and 2021, the number of transactions increased by around 25 % on the spot market. Through TTF, gas that is already on the Dutch network can be transferred without leaving the network, thereby promoting market liquidity. See Figures 4.22 and 4.23.

Figure 4.22 Spot of transactions (Source: ACER/CESR, 2022b)

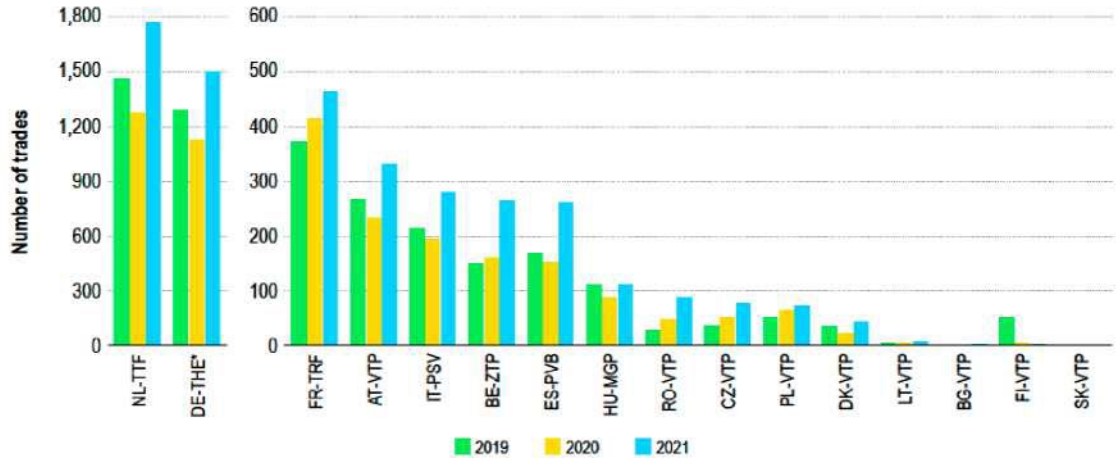
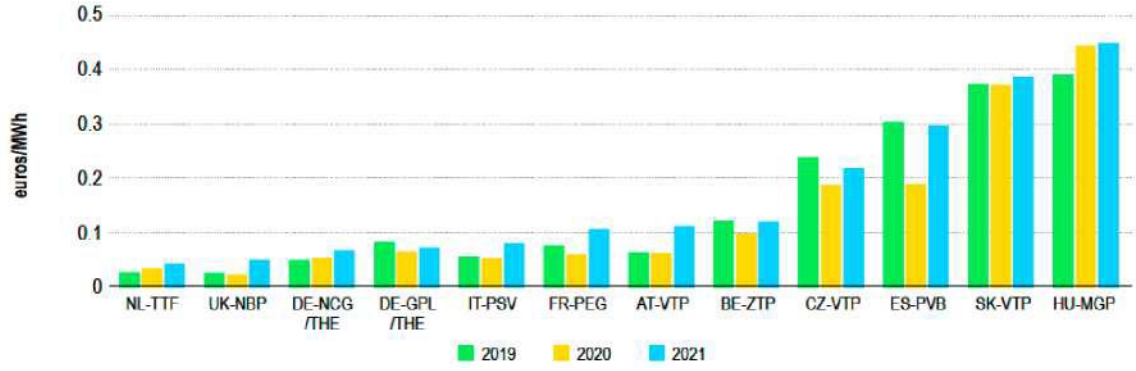


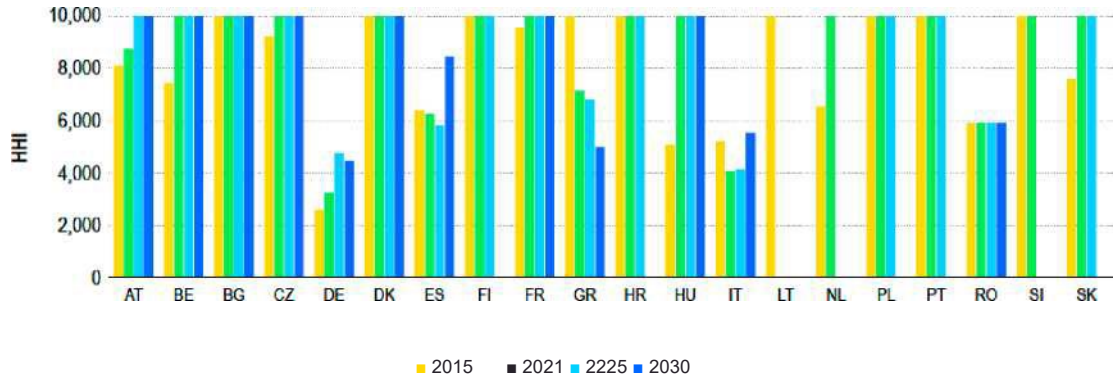
Figure 4.23 bid-ask spread spot market (Source: ACER/CESR, 2022b)



Figures 4.22 and 4.23: the average bid-ask spread of the day-ahead gas market in selected Euhubs in 2019 to 2021 (see Figure 4.23) and the number of daily average of day-ahead products exported in 2019 to 2021 (ACER/CESR, 2022b).

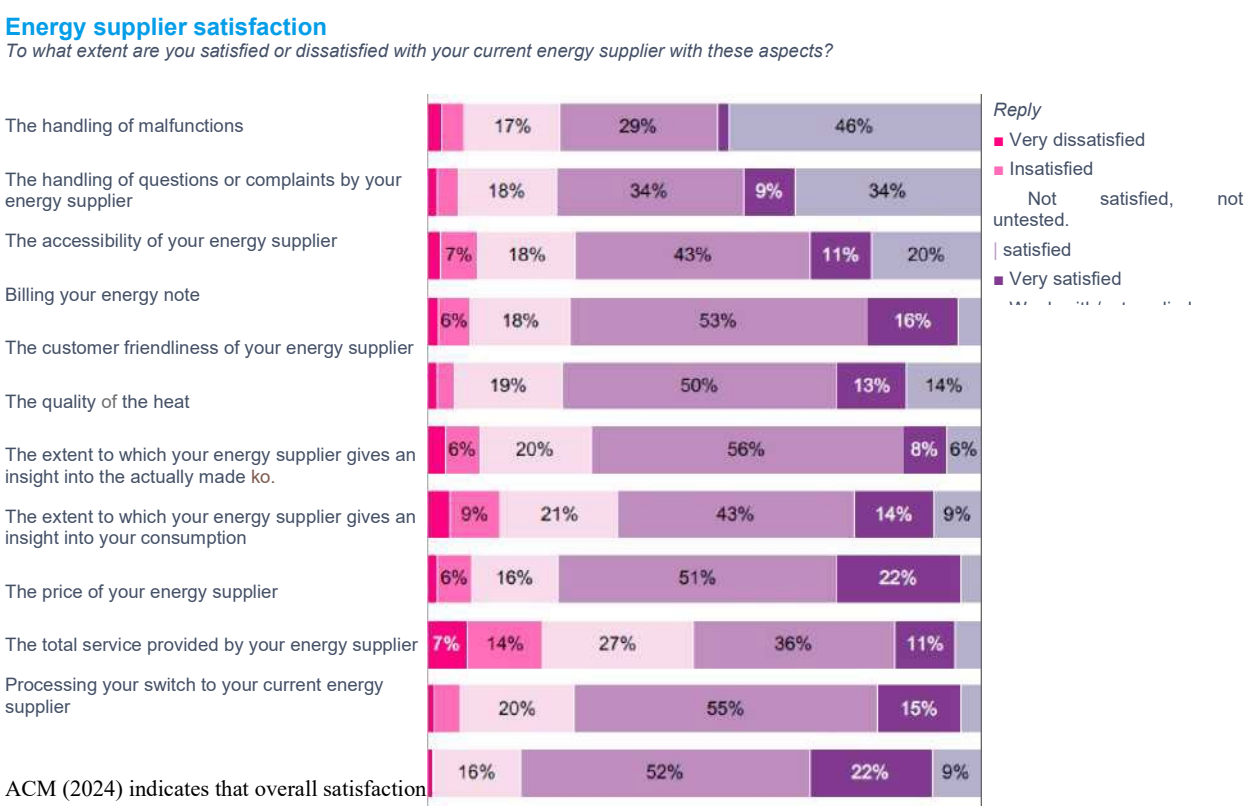
The aforementioned report on the wholesale gas market also includes indicators for the 'health' market (see Figure 4.24). As an illustration, the Netherlands scores on the indicators (Herfindahl-Hirschmann Index (HHI)). The higher the HHI, the larger the market share of the largest providers.

Figure 4.24 Overview of 'market health' indicators by EU Member State in 2021 (Source: ACER/CESR, 2022b)



Consumer satisfaction with energy suppliers

Figure 4.25 Consumers satisfaction with energy suppliers (Source: ACM, 2024)



ACM (2024) indicates that overall satisfaction with the service provided by energy suppliers is high, but decreased in 2023 compared to 2022.

V Energy poverty

The Netherlands has several policy orientations that contribute to reducing energy poverty and is working on strategic policy on this (see Chapter 3.4.4). In order to develop further and strategic policies in the Netherlands, data and knowledge about energy poverty in the Netherlands are needed. TNO has been investigating energy poverty in the Netherlands since 2018. In cooperation with the Ministry of Economic Affairs and Climate Policy (EZK), the Ministry of the Interior and Kingdom Relations (BZK) and the Ministry of Social Affairs and Employment (SZW), TNO launched the National Energy Poverty Research Programme in 2022, with the aim of monitoring energy poverty on a national and local scale, exchanging knowledge and ultimately developing strategic policies aimed at combating energy poverty. In addition, in 2022 the Ministry of Economic Affairs and Climate Policy (EZK) commissioned the Central Statistical Office (CBS) to develop an annual Energy Poverty Monitor, based on TNO (2021) (CBS, 2023j).

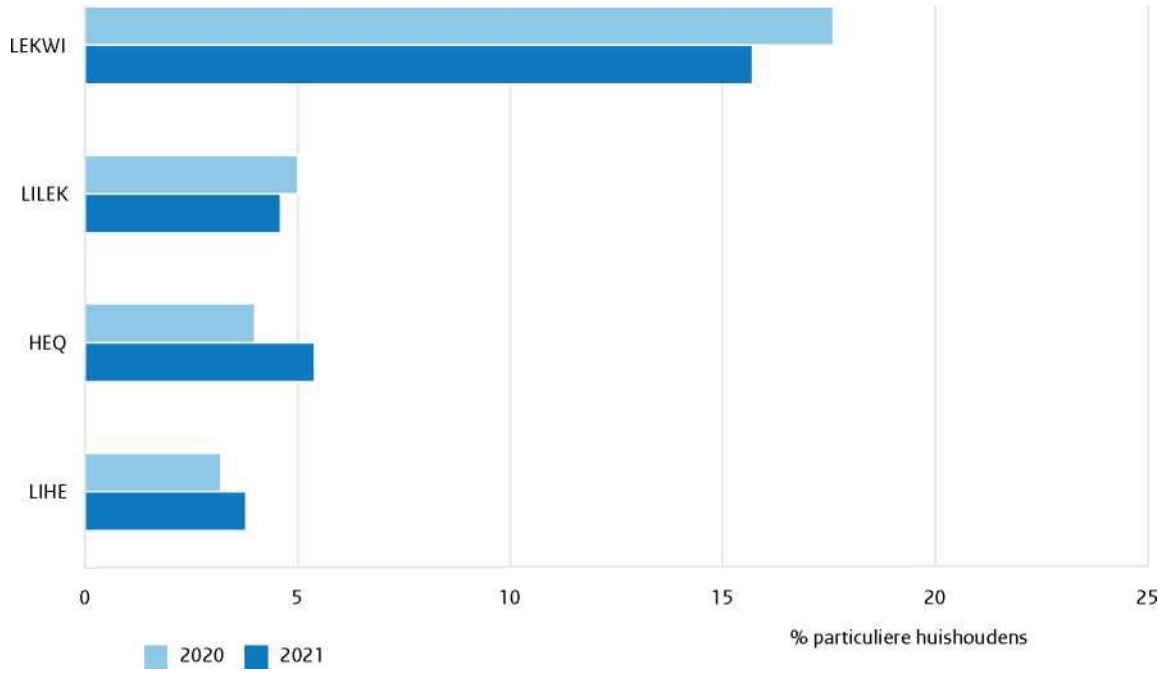
TNO uses a lack of access to affordable modern forms of home energy as a definition of energy poverty (TNO, 2021). Energy poor households often have high energy costs compared to their income, as they often live in poorly insulated homes and do not have the (financial) possibility to renovate their homes, or do not do so because they rent the house. In addition, energy poor households choose not to heat their homes to save energy costs (hidden energy poverty). TNO and CBS use four primary indicators for energy poverty:

- HEQ: high energy equals. Energy equals the part of the income spent on energy costs. Energy equals are considered high if a household pays more than 10 % of its income on energy costs.
- LIHE: low income combined with high energy bills. Low income is seen here as an income of up to 130 % of the low income threshold, with the exception of households with financial wealth among the highest 10 % in the Netherlands.
- LILEK: a low income combined with a dwelling of low energy quality. Households covered by this indicator may experience problems in residential comfort, for example due to beautiful spaces or because the dwelling is difficult to heat. In addition, this group is vulnerable to price increases in energy costs. In addition to this indicator, a distinction is also made between households with very poor energy quality (LEK), where it is very difficult to make the dwelling comfortable.
- LEKWI: low income combined with low-energy quality dwellings and little investment space to improve the dwelling. A low-income household as defined by LIHE or a household whose overall financial capacity and excess value of the dwelling is less than EUR 40,000 is considered to be a household with little investment space. Specifically, LEKWI shows how many households are financially unable to get their homes due to the energy transition.

The combination of low income and high energy costs (LIHE) and/or poor dwelling (LILEK) has been used in this report as the main indicator for demonstrating energy poverty in the Netherlands. In the CBS Monitor, this indicator can be found under the abbreviation LIHELEK. This combination indicator provides a good assessment of the extent of the energy poverty problem: it counts not only low-income households with high energy bills, but also low-income and low-energy quality households, correcting for the (significant) overlap between these two groups.

On 23 November 2023, the second Energy Poverty Monitor was published by the CBS, based on 2021 figures.

Figure 4.26 Households with some form of energy poverty (Source: CBS, 2023j)



Among the different forms of energy poverty, the group of households with poor housing and low investment space (LEKWI) is the largest. The group of low-income households and poor dwellings decreased slightly compared to 2020 (LILEK). Other forms of energy poverty have increased. The CBS monitor shows that out of 2 021 million households in the Netherlands in 7, more than 456.000 households struggle to pay their energy bills (CBS, 2023j), representing 6.4 % of energy-poor households in the Netherlands.

The vast majority of this group live in rented dwellings (88.7 % of which are in a corporation rented dwelling and 20.8 % in private rental). Around 11 % have owner-occupied dwellings.

The data is based on the Woonbase and is thus in line with recent fully available housing market figures. The population in the monitor is based on the population of private households in the Woonbase on 1 January of the reporting year. The characteristics of households and dwellings, such as income and energy consumption, refer to the whole reporting year. This monitor will be repeated annually by Statistics Netherlands (CBS) in order to monitor developments in the Netherlands properly, in line with the European Commission's recommendations to the National Energy and Climate Plan (INEK).

4.6 dimension Research, Innovation and Competitiveness

I Trends in the low carbon technologies sector

Trends in the low carbon technology sector in the Netherlands

This section illustrates the economic importance of the Dutch energy sector in recent years with a focus on developments in the shift towards development and deployment of low-carbon energy saving and renewable energy technologies. This section distinguishes between energy exploitation and activities related to energy investments.162 Energy exploitation is generally capital intensive. Investment activities, on the other hand, are often labour-intensive and thus important for the employment potential of energy supply. However, the available data used in this chapter still mainly concern energy-related activities. They provide one of the total energy-related sectors and then developments in shares of renewable energy and energy-related low-carbon technologies in that total. Subsequent reports shall also include, where possible, other non-energy related climate-relevant activities.

International position

Comparable definitions and data of low carbon technologies and their "sector" are still being developed internationally. Many definitions and data are still incomparable and it is therefore difficult to provide official, comparable data on the international position of low-carbon technology sectors of countries.

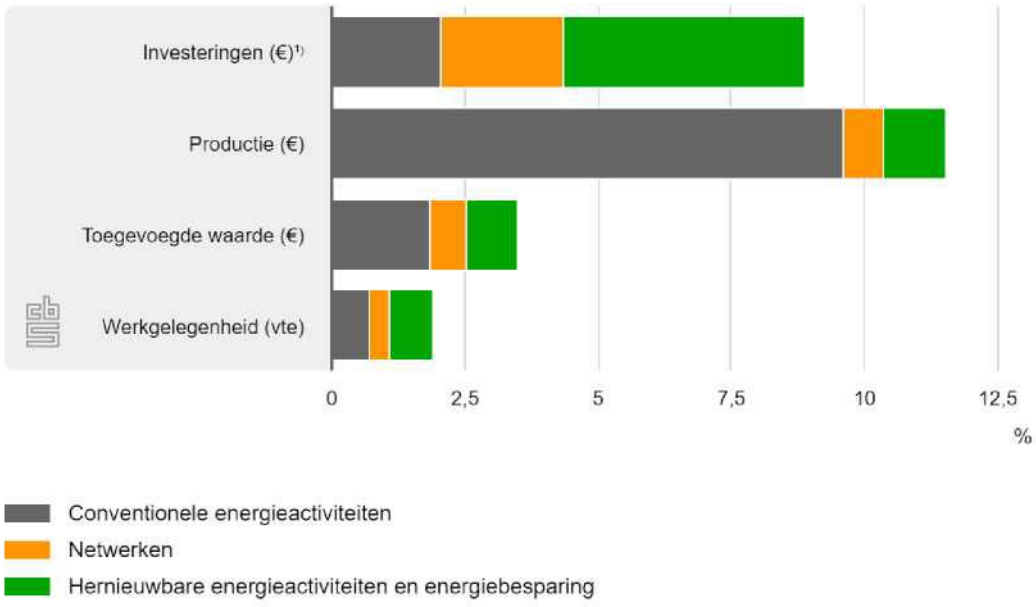
However, the available data used in this chapter still mainly concern energy-related activities. They seek to provide an overview of the total energy related sector and then to show developments in the shares of renewable energy and energy-related low carbon technology in that total. Subsequent reports shall also include, where possible, other non-energy related climate-relevant activities.

Key economic indicators of the energy sector

The total contribution of the energy sector to gross domestic product in 2019 is 3.5 % (CBS, 2020). This sector is capital intensive; the share of investment (8.9 %) is four times the share of employment (1.9 %).
A first overview of the economic importance of the energy sector in the Dutch economy in 2019 is outlined in Figure 4.27 using a few key indicators.

Figure 4.27 Share of energy activities compared to the Dutch economy as a whole for different economic indicators in 2019 (source: CBS, 2020)

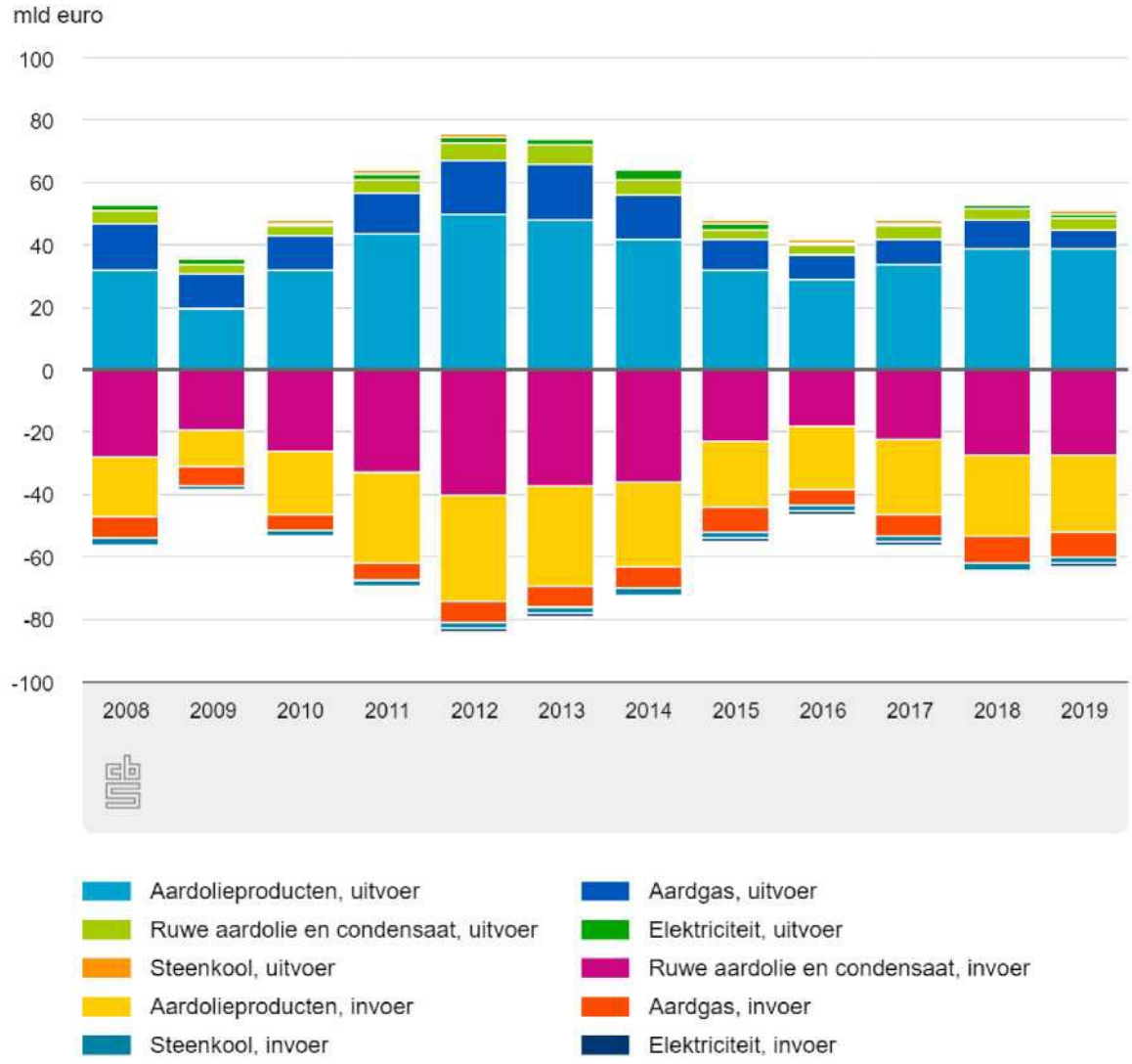
162Energy exploitation consists of activities involving the extraction, production, conversion, trade, storage, transport and supply of energy (including refineries, oil and gas extraction, refuelling stations and renewable energy production). In order to keep these activities at the same level or grow with the demand of final consumers, investments are made by the operating sectors. In addition, final energy consumers themselves also invest, for example in new energy-efficient industrial boilers or insulation. These investments by operating sectors and final consumers in turn lead to economic activities in other sectors, such as construction and installation companies, technology products, R & ampD, public administration, consultancy and other services, and are referred to as "investment activities". For more information on the delineation and definitions of energy-related activities and the distinction between conventional and sustainable, see background reports (CBS 2015, Van dril et al. 2016).



Conventionele energieactiviteiten
Netwerken
Hernieuwbare energieactiviteiten en energiebesparing

1 (average of 2016-2018)

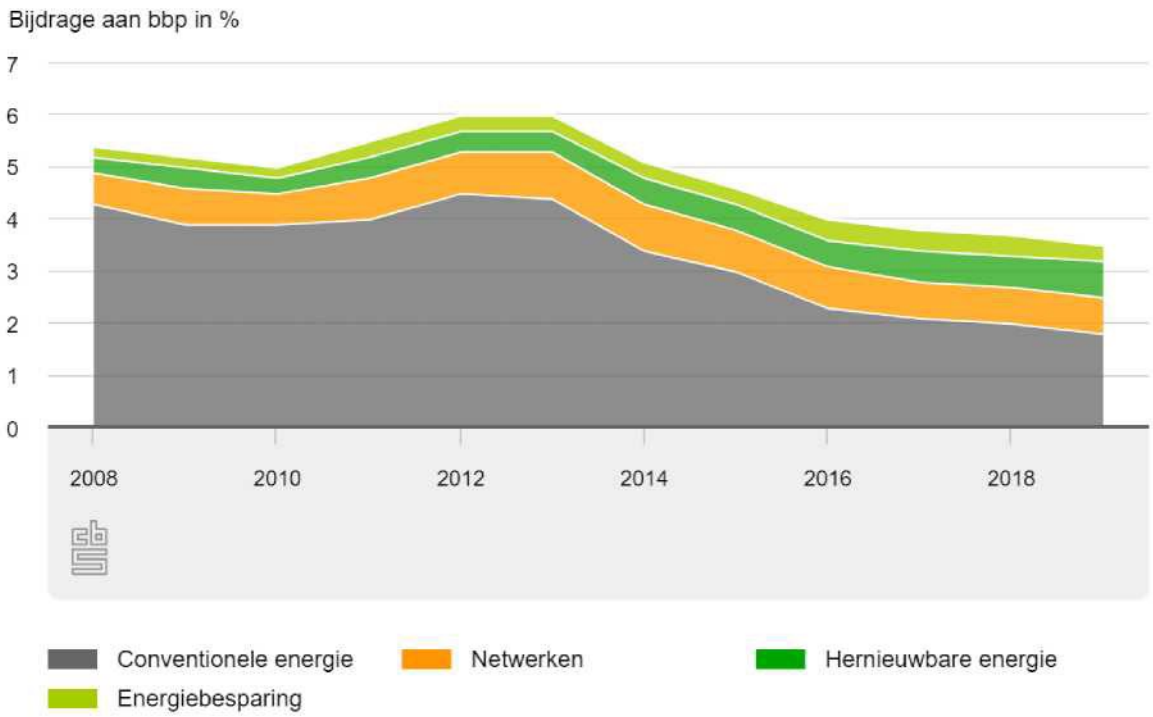
Figure 4.28 Import and exports of energy products between 2008 and 2019, at current prices (Source: CBS, 2020)



The period 2015-2019 shows a variation in the total import value from 45 billion to 66 billion and exports from 40 billion to 54 billion (see Figure 4.28). This variation is explained by both price and volume fluctuations. In particular, oil prices fell sharply between 2014 and 2016, as can be seen in the import and export value of energy products. Since 2016, energy prices have picked up again. The value of natural gas exports peaked in 2012, also due to the high extraction of gas in Groningen. In the following years, natural gas exports decreased, partly as a result of reduced gas extraction in Groningen and a fall in gas prices.

The following sections describe further turnover, investment and employment in the energy sector, taking into account the low-carbon technology shares around renewable energy and energy saving technologies.

Figure 4.29 Contribution of energy-related activities to the Dutch economy as a percentage of total GDP (source: CBS, 2020)

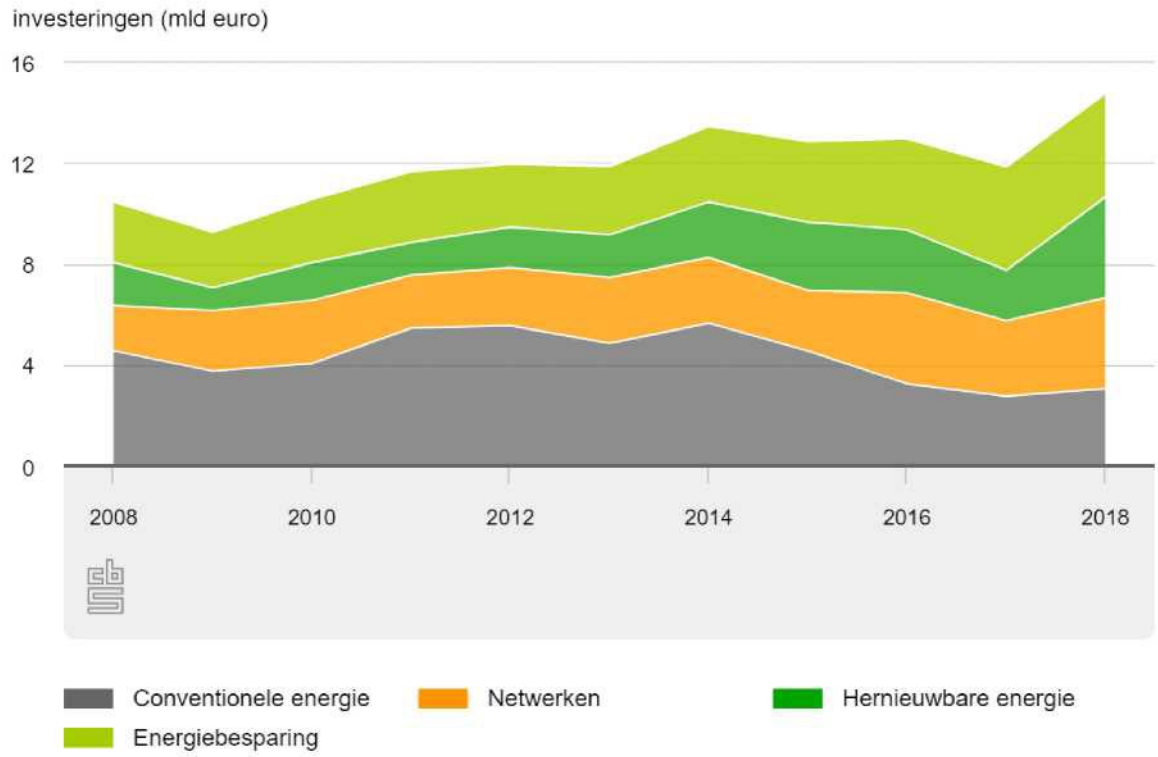


The contribution of energy related activities for conventional and renewable energy to the Dutch economy is outlined in Figure 4.29. The peak in the 2012s and 2013s was mainly related to relatively high levels of natural gas extraction, investment in new coal-fired power plants and high energy prices, which led to a temporary increase in value added in the conventional energy sectors. After this peak, there have been no major investments in conventional power plants and natural gas extraction has decreased. This is also reflected in the sharp decline in the value added of conventional sectors in recent years. The value added of renewable energy shows an increasing trend from 0.3 % in 2010 to 0.7 % in 2019 from 2008 onwards.

While the nominal value added of renewable energy is relatively small, it has grown steadily in recent years, from EUR 0.1 billion in 2000 to almost EUR 2.9 billion in 2019. As the GDP of the Dutch economy as a whole grew less strongly in this period, the share of renewable energy and energy saving in total GDP increased from 0.02 % in 2000 to 0.36 % in 2019.

Total energy investment increased gradually up to 2014, but decreased slightly in the years 2015 to 2017 (see Figure 4.30). The decrease over this period is the result of opposite trends in the underlying sectors. Investment in conventional sectors has fallen sharply since 2014, while investments in renewable energy and energy savings have increased. Investments in networks have also slightly increased over this period.

Figure 4.30 Evolution of investments in energy installations and energy saving, in current prices (Source: CBS, 2020)

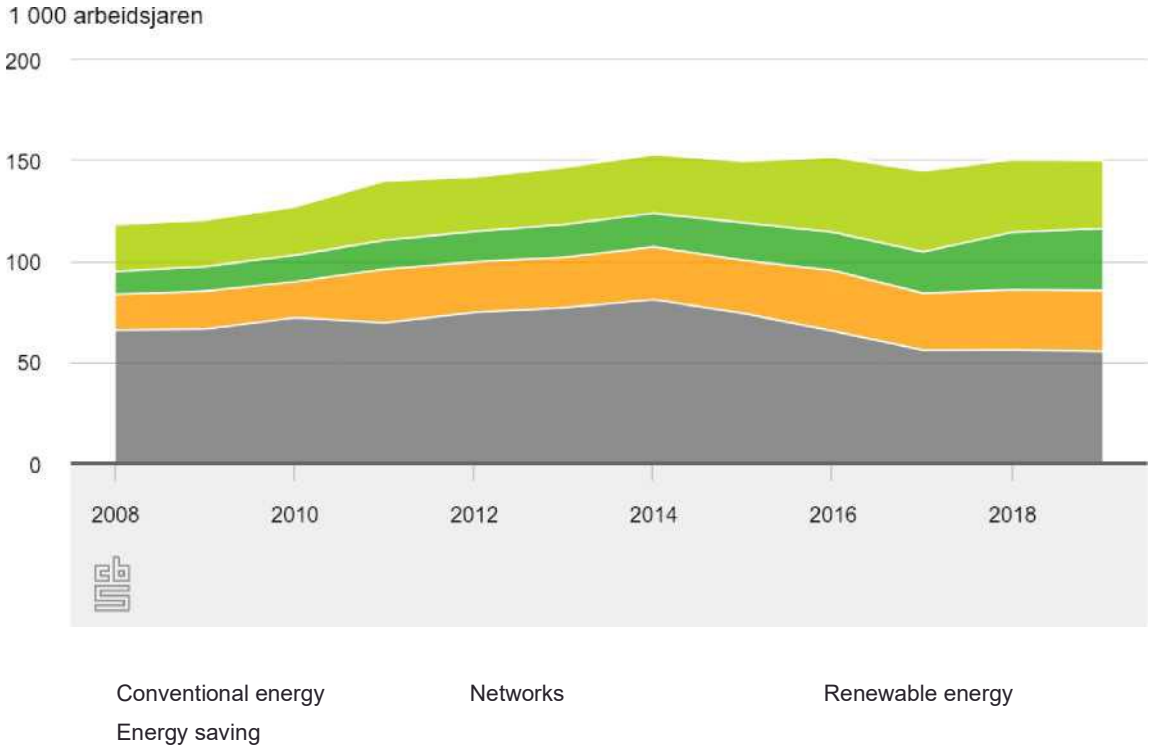


Total investment increased from over EUR 2018 to almost EUR 10 billion between 2008 and 15. While in 2008 there was even more investment in conventional energy (EUR 4.6 billion) than in renewable energy and energy saving combined (EUR 4.1 billion), in 2018 there was more investment in both renewable energy (EUR 4 billion) and energy saving (EUR 4.1 billion) separately than in conventional energy (EUR 3.1 billion). This has been the subject of a reversal over the last decade. In addition, investments in energy networks, such as the electricity grid, have also increased. Investments in renewable energy increased sharply in 2018, after a dip in 2017. This is particularly true of solar and wind power, especially off-shore wind farms, but the other forms of renewable energy also show an increase.

Investment in the infrastructure needed to transport and distribute gas and electricity increased from EUR 2.6 billion in 2014 to EUR 3.6 billion in 2018.

The investments mentioned above have led to an increase in employment (see Figure 4.31). Total employment in activities resulting from investment in energy-related activities increased to 2 014 thousand full time equivalents (full-time jobs) up to 104. During the period 2008 to 2014, the largest increase in employment occurred, with investments in conventional energy (over 15 thousand full-time jobs), followed by networked jobs (almost 7 thousand full-time jobs). After 2014, employment in conventional sectors fell sharply, while employment in renewable energy, grids and energy savings increased.

Figure 4.31 Evolution of energy-related gross employment (Source: CBS, 2020)



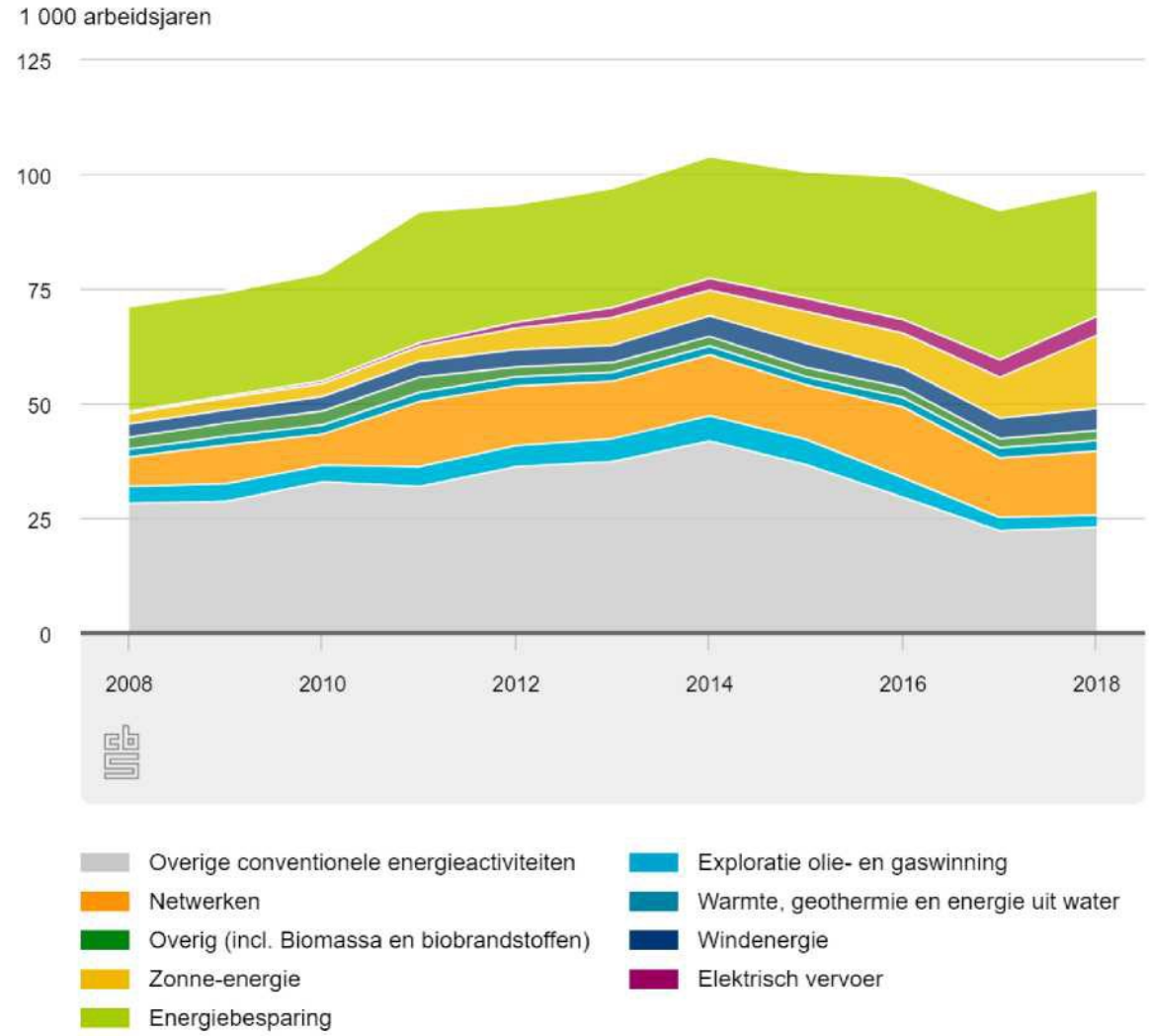
Employment in low-carbon technology sectors through investment

In total energy-related employment, around one third is related to energy exploitation and two thirds are related to investment. Developments in investment can be translated into economic activities resulting from it, i.e. the expected direct demand for labour from investment. Whether this demand for labour is also transformed into employment depends on labour productivity and whether companies can find suitable workers.

Direct labour demand in the Netherlands differs for different technologies. A large part of the energy technology used is imported, which does not result in demand for labour in the Netherlands to produce this technology. The installation of the technology is generally carried out by Dutch companies. This has been taken into account in the realisation of the investment activities (of dril, 2019) (see Figure 4.32).

In particular, the activities related to energy saving and solar energy result in relatively high demand for labour within the Netherlands. These include activities such as the insulation of homes and the installation of solar panels. This is labour-intensive work. For solar energy, employment almost tripled between 2014 and 2018. Increased investment in other technologies, such as wind and electric transport, also generate additional demand for labour. However, work on these technologies has a higher share of imports and higher costs per year of work results in equally high investment in fewer full-time jobs. The increase in wind energy investment in recent years has therefore not directly translated into an increase in employment in the wind energy sector. It is now back to the 2014 level.

Figure 4.32 Gross employment in investment activities 2008-2018 (Source: CBS, 2020)



In 2018, investments in electric transport accounted for more than 4.200 years of work in the Netherlands. This involved a variety of activities, such as the installation of charging stations, but also the development and production of batteries, software, propulsion technology and vehicles. Since 2008, Dutch employment in electric transport has been increasing.

II Trends in spending, research and innovation on low-carbon technologies

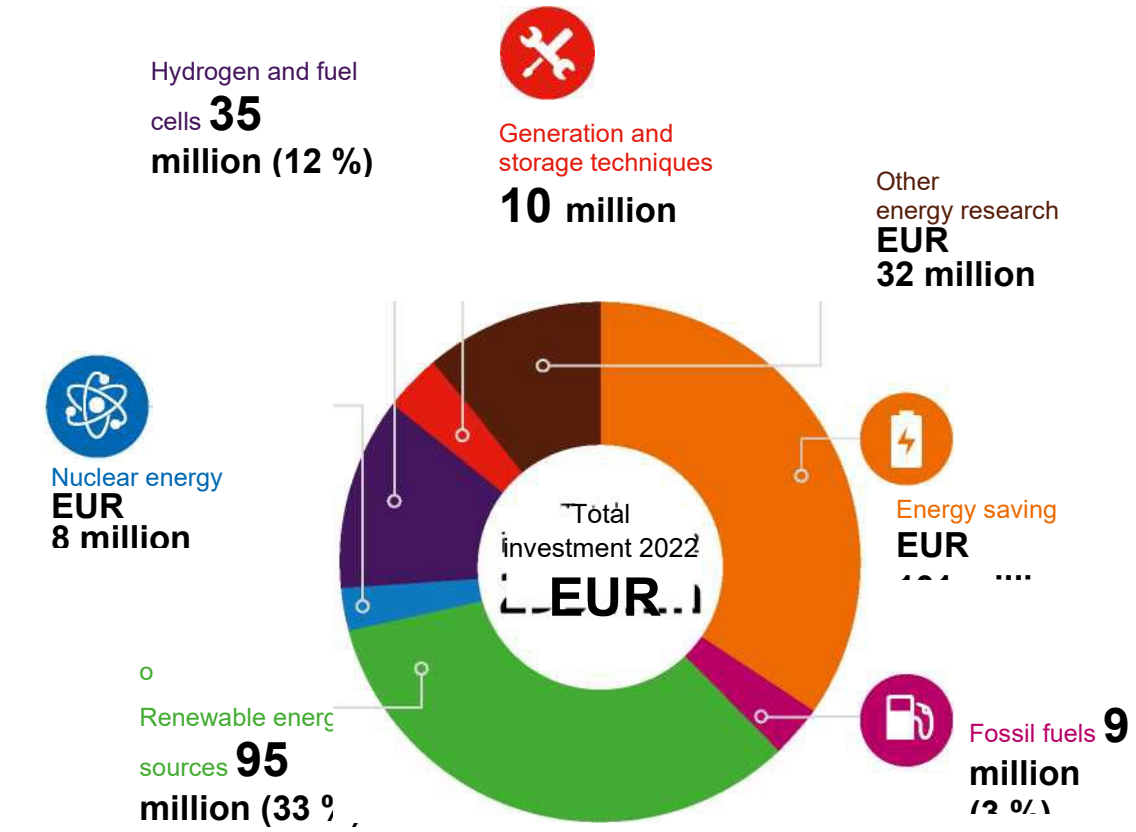
Each year, RVO, commissioned by the Ministry (EZK), publishes the Monitor 'Public financed energy research' (RVO, 2023). This report is used for reporting to the IEA. This provides an overview of the Dutch government's expenditure on energy research by knowledge institutions, universities and companies and its focus on underlying energy topics. Public investment in energy research through the fiscal instruments (WBSO), public credits (Innovation Fund SME +) and direct payments by the Ministry of OC to universities are outside the scope of this monitor.

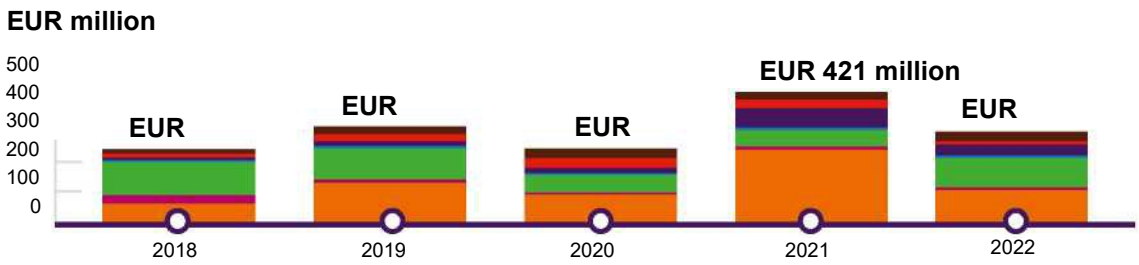
In 2022, the government invested EUR 290 million in public funds in energy research and development (RVO, 2023), down from the previous year (see Figure 4.33). This has been made available in particular as a result of a reduction in additional resources for research into energy savings. In 2022, almost one third (EUR 95 million) of the funds were spent on innovation projects for renewable energy sources and EUR 101 million on research and development of energy-saving measures. Public investment in

hydrogen energy research has almost halved compared to 2021. Investments in fossil fuel research (conventional energy) are limited and focus in particular on carbon capture and storage (CCS).

Figure 4.33 does not show companies' own (private) expenditure within energy innovation projects.
In the Energy Approach sector, since the launch of the Top Sector Policy in 2012, its size has fluctuated around EUR 100-150 million per year, accounting for around 40 % of total investment. This does not capture all investments in energy innovation, because companies also invest in energy innovation themselves, but do not always make this information publicly available.

Figure 4.33 Public investments in energy research based on committed subsidy, in current prices (Source: ROP, 2023)

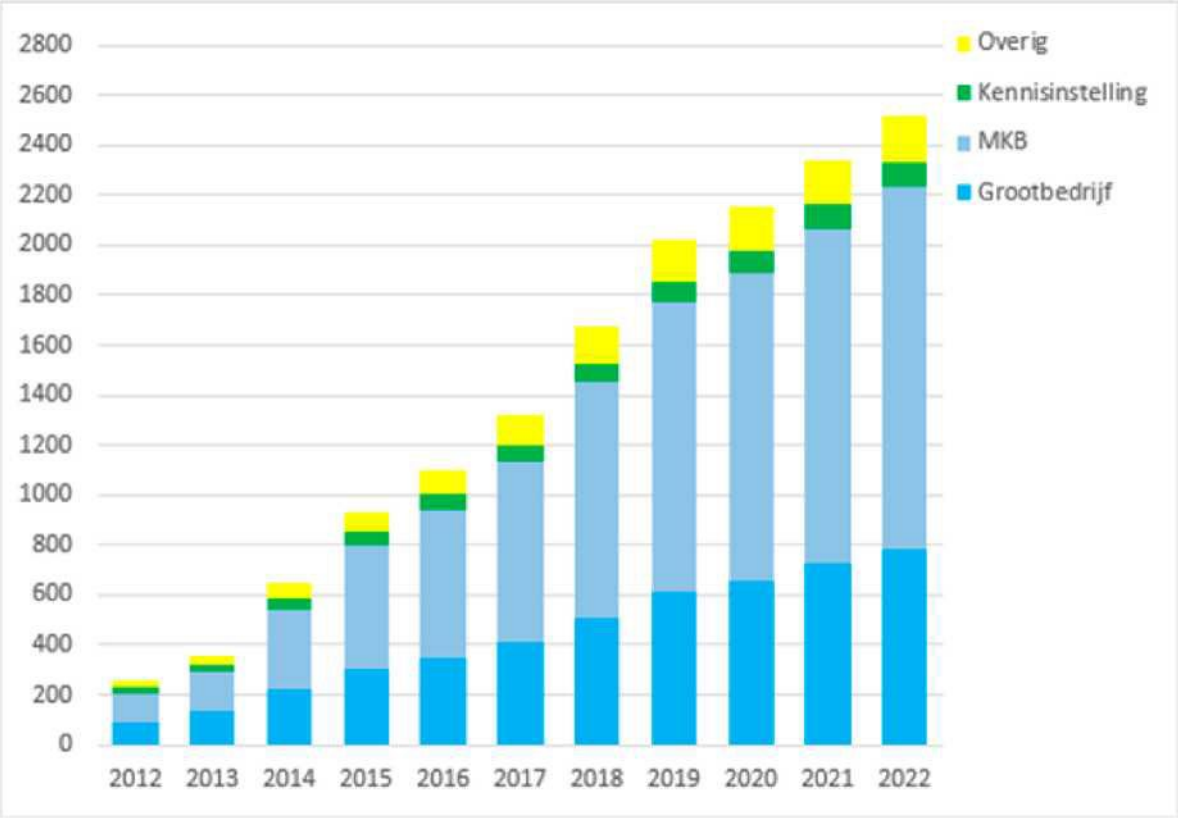




Number of holdings

One of the aims of top sector policy is to improve cooperation between companies, including SMEs, with knowledge institutions. RVO helps monitor the number and type of organisations involved in the energy innovation projects. Figure 4.34 shows how the Energy Innovation Network of the Energy Sector grew between 2012 and 2018.
It distinguishes between the participations of the different types of organisations.

Figure 4.34 Number of unique organisations involved in energy innovation projects Energy sector (Source: ROP, 2023)

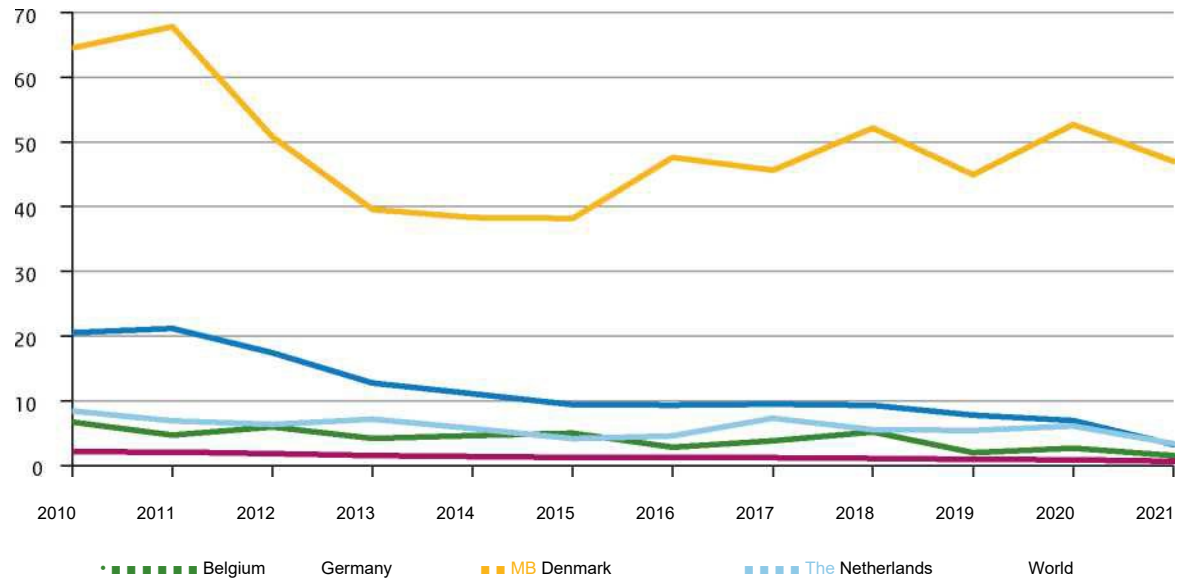


In total, more than 2.500 unique organisations participate. On average, three participants work together in a project. The number of SMEs participating in the projects has increased significantly since 2012. This is true both in absolute numbers and relative to the other types of organisation. SMEs now account for more than 60 % of participants. The number of organisations in the 'Other' category is also increasing. These include government organisations such as water boards.

Patent applications in renewable energy

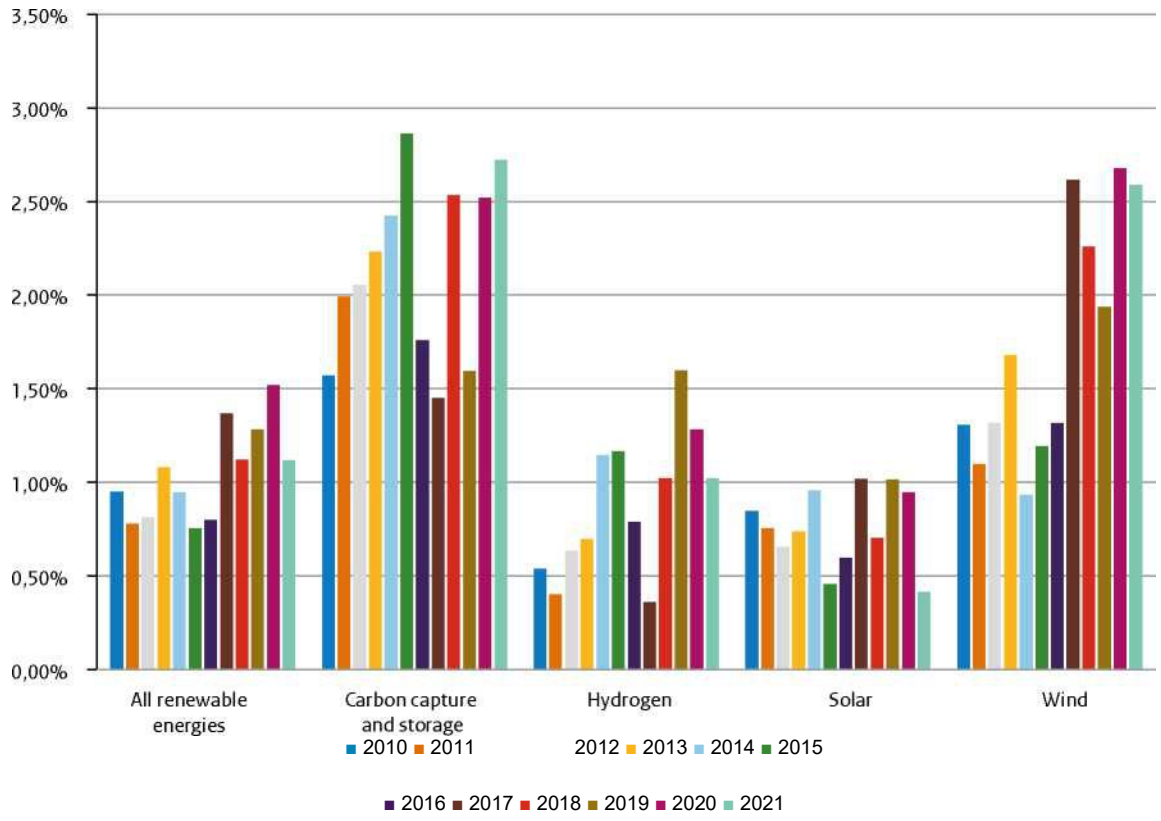
Figures on the number of patent applications show results of innovation efforts. Figure 4.35 shows the number of patent applications per million inhabitants in the field of renewable energy filed from the Netherlands and a number of other European countries. The number of patent applications per million inhabitants worldwide is also shown. The number from the Netherlands has fluctuated over the last 10 years. The numbers per million inhabitants are higher than the global average, but lower than in Germany and Denmark.

Figure 4.35 Number of clean energy patents per million inhabitants (Source: OECD, 2024; edited by



The OECD also looks at the trends in patent applications for different collaborative technologies for different countries and the world as a whole. Figure 4.36 shows the evolution of the Netherlands' share of patent applications worldwide for a number of specific technologies. The share of the Netherlands is particularly high in wind energy and carbon capture and storage. Strong growth is particularly visible for wind. Since 2017, the Dutch share of hydrogen-related patent applications has also grown.

Figure 4.36 Development share of Dutch patent applications worldwide for specific technologies (Source: OECD, 2024; edited by RVO)



Number of researchers

As indicated above in this section, energy related employment increases as a result of investments in renewable energy. CBS estimated the distribution of employment in renewable energy and energy saving investments in the period 2008 to 2016, both by product profile (energy technology) and by process profile (type of work). According to this study, the number of working years for researchers through investments in renewable energy and energy saving has been over 2 010 years since 3.200 (CBS, 2018).163 There are no recent data available on the total number of energy-related employment years of researchers across the Netherlands.

III Building current energy prices and subsidies for (fossil) energy

The Netherlands has a differentiated system of taxes and surcharges that affect energy consumption. In principle, consumers should pay energy tax on electricity or gas supplied via distribution network, a direct line, purchased from the stock exchange or otherwise obtained. For consumers, value added tax is also added (currently 21 %).

The level of energy tax depends on the quantities of natural gas and electricity. The Netherlands has a so-called degressive tariff structure: the higher the consumption, the lower the tax rates. In that regard, it is important that all customers go through all tax bands in the same way. The rates also vary by type of tax and are subject to policy adjustments on an annual basis and also indexed for inflation. The rates are available in tables attached to the Tax Department.164

163https://www.cbs.nl/nl-nl/achtergrond/2018/50/de-impact-van-de-energietransitie-op-de-werkgelegenheid.
tax_op_environmental basis/taries_environmental taxes/tablen_taries_environmental taxes.

Several exceptions to taxation are in place, including maintaining a level playing field between Dutch companies and their foreign competitors. These include an exemption for mineralogical and metallurgical processes, a conditionally applicable reduced rate of taxation for natural gas used by the glasshouse horticulture sector, an exemption for so-called dual consumption of coal in the production of steel and an exemption for the use of electricity in the production of aluminium, chlorine and other electrolytic processes.

In addition, subject to conditions, exemptions from energy taxation shall apply to the consumption of:
- Self-generated electricity from renewable energy sources;
- Electricity produced from an emergency installation in the event of a failure of supply from the distribution network;
- Self-extracted landfill gas, sewage treatment gas or biogas;
- Electricity produced from a cogeneration installation.
- Exemption from tax on the use of coal and natural gas in power stations.

The supply of electricity to shore-side electricity installations is also subject to a reduced rate. If a cooperative or 'association of owners' (VvE) generates renewable electricity, the 'Subsidieregeling Coöperatieve Energieproduktie' (SCE) applies.

All electricity customers benefit from a tax reduction on the energy tax. This is a fixed amount to which each customer with an electricity connection is eligible. The amount is independent of the amount of energy consumed. The amount in 2022 is EUR 824,77 (including 21 % VAT. The temporary reduced VAT rate has not yet been offset from 1 July to 31 December 2022). The government temporarily increased the tax reduction in 2022 to compensate for high energy prices. The amount in 2023 is EUR 596,86 (including 21 % VAT).

Network operation and transmission costs

Network management costs are also referred to as network costs or capacity tariff. The costs consist of: fixed network, capacity tariff, periodic connection fee and meter rental. These vary from one system operator to another. Each region has its own network operator, which sets its own capacity tariffs. On average, network operation costs are EUR 2 023 559 (EUR 342 for electricity and EUR 217 for gas, including 21 % VAT (Environmental Centre, 2023)).

The energy supplier charges fixed costs for supplying gas and electricity (fixed charge). For example, suppliers pay their operating costs and records. It is up to the energy company to determine these fixed costs. On average, a household pays EUR 72 for gas and EUR 73 for electricity. However, there are large differences between suppliers.

[164] https://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/belastingdienst/zakelijk/overige_belastingen/

IV Overview of expenditure and income foregone related to fossil fuels and renewable energy generation

There are no subsidies in the Netherlands exclusively aimed at promoting the consumption of energy from fossil sources. However, the exemptions from energy taxation and lower rates lead to missed taxation ofrevenues that are classified as subsidies in line with the WTO definition. This "subsidy" may, more broadly, lead to higher consumption of both fossil and renewable energy.

In recent times, there has been an increasing public debate about the benefits for users of fossil fuels and raw materials that do not allow sustainable alternatives to be sufficiently developed. There are no structural direct fuel price subsidies in the Netherlands. However, various expenditure schemes are (indirectly) linked to fossil energy consumption, fiscal fossil exemptions, rebates and adjusted tax rates (as described above). The Cabinet provided an overview of such arrangements in the 2024 Miljoenbrief. This overview will be updated annually.

Tables 4.11 and 4.12 below provide an overview of the budgeted expenditure from the 2024 national budget relating to fossil fuels and subsidies to promote innovation and the use of different forms of renewable energy and thereby phase out the use of fossil fuels. These are both subsidies (Table 4.11) and tax schemes (Table 4.12). An important remark is that there is no clear distinction between fossil fuel and green fuel. While it is clear that some fuels and technologies are fossil (e.g. coal and natural gas), this is sometimes less obvious, for example in terms of efficiency, energy savings or electricity consumption. As a result of the growth of renewable electricity production, its

share of total electricity production is increasing steadily in the coming years. In the case of CCS (carbon capture and storage), this is even more important: this is not a fossil fuel itself, but can be used to store CO2emissions, for example from the use of fossil fuels. This problem of demarcation also applies to the extent to which public authorities provide direct or indirect subsidies for the extraction and use of fuels. In case of doubt, this table is based on a broad definition, even if they are sometimes measures or technologies that contribute (or have the potential) to reduceCO2emissions.

Table 4.11 Overview of energy subsidies (National Budget 2024)

Policy measure	Sector	Energy carrier (s)	Type of instrument	Grant volume (euros)				
				2020	2021	2022	2023	2024
Dei + Demonstration of energy and climate innovation	Economic sectors	Renewable energy	Subsidy	EUR 95 million	EUR 53 million	EUR 71 million	EUR 77 million	EUR 90 million
DKTI Demonstration scheme Climate technologies and innovations in transport	Transport Economic and non-economic	Renewable energy	Subsidy	N/A	EUR 37 million	N/A	N/A	N/A
EC Energy Efficiency Investment Scheme for glasshouse horticulture	Agriculture	Renewable energy	Subsidy	EUR 9 million	EUR 17 million	EUR 47 million	EUR 29 million	EUR 53 million
ETS Indirect Emission Costs Compensation Scheme	Energy-intensive industry	All energy sources	Other	EUR 110 million	EUR 173 million	EUR 88 million	EUR 0 million	EUR 0 million
Renewable Energy Scheme (HER)	Economic and non-economic sectors	Renewable energy	Subsidy	EUR 38 million	EUR 26 million	EUR 30 million	EUR 45 million	EUR 42 million
ISDE Investment Subsidy Sustainable Energy and Energy Savings (ISDE/ISDE-KA)	Households	Renewable energy	Subsidy	EUR 101 million	EUR 112 million	EUR 250 million	EUR 591 million	EUR 686 million
May Market introduction of energy innovations in glasshouse horticulture	Agriculture	Renewable energy	Subsidy	EUR 4 million	EUR 8 million	EUR 3 million	EUR 2 million	EUR 6 million
Beautiful (Mission-driven Research, Development and Innovation Scheme)	Economic and non-economic sectors	Renewable energy	Subsidy	EUR 98 million	EUR 55 million	EUR 60 million	EUR 64 million	EUR 55 million
National Growth Fund – Greenhouse of the Dutch economy project	Economic and non-economic sectors	Renewable energy	Subsidy	N/a	N/a	EUR 11 million	EUR 315 million	EUR 85 million
Public Private Cooperation (PPS)	Economic and non-economic sectors	Renewable energy	Subsidy	N/a	EUR 172 million	EUR 200 million	EUR 220 million	EUR 201 million
RVV Verdurzaming (Regulation on the reduction of the rental levy)	Households	Renewable energy	Tax reduction	N/a	EUR 2 408 million	EUR 656 million	EUR 0 million	EUR 0 million
Natural gas free rental housing incentive scheme (Startmotor component)	Households	Renewable energy	Subsidy	EUR 29 million	EUR 14 million	EUR 4 million	EUR 42 million	N/A
Co-operative Energy Generation Subsidy Scheme (SCE)	Economic and non-economic sectors	Renewable energy	Subsidy	EUR 0 million	EUR 19 million	EUR 496 million	EUR 0 million	EUR 0 million
SDE + + Incentive scheme Sustainable Energy Production and Climate Transition	Economic and non-economic sectors	Renewable energy	Subsidy	EUR 1 633 million	EUR 2 537 million	EUR 873 million	EUR 1 318 million	EUR 788 million
Top Sector Energy Studies (TSE Studies)	Economic and non-economic sectors	Renewable energy	Subsidy	EUR 12 million	EUR 11 million	EUR 14 million	N/A	N/A
VEKI Accelerated Climate Investment Industry	Industry	Renewable energy	Subsidy	EUR 21 million	EUR 73 million	EUR 32 million	EUR 30 million	N/A

Table 4.12 Overview of fiscal measures for energy (source: Million's note, 2024)

OVERVIEW OF FISCAL GREEN SUBSIDIES (EUR)	2020	2021	2022	2023	2024
EIA (Energy Investment Deduction)	EUR 146 million	EUR 186 million	EUR 297 million	EUR 249 million	EUR 259 million
Mia (Environment Investment Deduction)	EUR 75 million	EUR 101 million	EUR 206 million	EUR 192 million	EUR 192 million
VAMIL (Free Deletion Environment Investment)	EUR 15 million	EUR 18 million	EUR 23 million	EUR 25 million	EUR 25 million
EV passenger cars tax incentives (KA package)	EUR 38 million	EUR 332 million	EUR 390 million	EUR 378 million	EUR 483 million
Tax incentives EV (not applying HADK, targeting more private rather than business)			EUR 20 million	EUR 191 million	EUR 217 million
Energy taxation – netting scheme	EUR 454 million	EUR 502 million	EUR 335 million	EUR 607 million	EUR 564 million
Energy taxation – reduced rate of charging stations EV	EUR 8 million	EUR 14 million	EUR 9 million	EUR 30 million	EUR 41 million
Energy taxation – reduced rate of locally reprocessed renewable energy	EUR 7 million	EUR 0 million	EUR 0 million	EUR 0 million	EUR 0 million

Announced adjustments to energy taxation

As described in Chapter Three, at the end of April 2023 the government announced a new package of policy measures to reduce emissions by at least 55 % by 2030.165 The package also includes proposals to phase out fiscal advantages for fossil fuels and raw materials and to revise energy taxation.

The government has already phased out several of these schemes in recent years. For example, the refund scheme in the energy tax on electricity in favour of energy-intensive businesses was abolished with effect from 1 January 2023.

No budget has been made available for the so-called indirect cost compensation for ETS companies as of 2023. In addition, energy tax benefits will be phased out in the next few years: energy taxation is becoming less degressive and a number of exceptions in the field of energy taxation are gradually adjusted. These include phasing out the reduced rate of energy tax on natural gas for the glasshouse horticulture sector and limiting the existing input exemption from the energy tax on natural gas for use in so-called combined heat and power plants (CHP). In addition, the tailor-made arrangements, the plastics blending obligation and the strengthened requirements of the European Renewable Energy Directive (REDIII) will further phase out fossil fuels and raw materials in the coming years. And the Dutch commitment to negotiations on the European Energy Taxation Directive (ETD) aims at accelerating fiscal greening across the EU.

The phasing out of fossil schemes should be carefully weighed and should not be an end in itself, but viewed in a broader perspective of pricing externalities and climate policy goals. Any further phasing out of these schemes should therefore be carefully considered, taking into account, inter alia, (accumulation of) burdens and burden-sharing, carbon leakage and the impact on new business.

Recently, the report on Building blocks for a better tax system, in which the various schemes set out in the Miljoenbrief have developed possible paths. A subsequent government will have to decide whether and to what extent these measures can be phased out.

5 impact assessment of planned policies and measures

This chapter looks at the impact of planned policies and measures as referred to in hChapter Three. These are based on the KEV2023 projections taking into account the policy as known as at 1 May 2023 (see Table 2 of Annex 2).

The approach in the KEV2023 differs from that of the KEV2022, which served as the basis for the projections in the 2023 draft update of the INEK. In the KEV2023, the KEV2022 projections have been updated only in broad terms. This means that only those post-KEV2022 (policy) changes that have a substantial impact on estimated greenhouse gas emissions, renewable energy

165Parliamentary paper 32813, No 23.

and energy savings have been analysed. The projections for the consumption of bunker fuels have not been updated.

The main policy changes stem from the European decision-making process on the “Fit-for-55 package” and the European Commission’s REPowerEU proposal, as well as from national decision-making such as the 2023 Spring Package. Important changes to what was considered in the KEV2022 as defined and planned policies have also been taken into account. The reference date before that date was 1 May 2023. Changes in statistics, models and sectoral developments are only taken into account if they have a substantial impact on greenhouse gas emissions, renewable energy and energy savings.

The following section discusses the main achievements of the KEV2023. Since there are no different policy variants in the KEV2023, this is not broken down by policy adopted, planned or on the agenda.

5.1 Impact of planned policies and measures on the energy system and greenhouse gas emissions and removals

I Greenhouse gas emissions

In the KEV2023, the KEV2022 estimates were broadly updated, following changes in climate policies that have a substantial impact on greenhouse gas emissions, renewable energy and energy savings in 2030 (PBL, 2023a; hereinafter referred to as KEV2023). The main sources for this are the Spring Note 2023 (EZK, 2023b; hereafter: spring Package), existing national climate policy plans and European policies on the agenda. In addition, some changes in statistics, models and sectoral developments have also been taken into account if they have a substantial impact. Based on these changes, one new estimate has been prepared for greenhouse gas emissions for the current year 2030.

However, a large part of the existing climate plans and the additional Spring Package were not yet sufficiently concrete. Some of these plans are broadly assessed as to the potential emission reduction effects in 2030, while another part of the plans was not possible, as there were not yet sufficient indications for this. Table 5.1 provides an overview of the main climate and energy policy measures on the agenda for which an impact assessment has been made.

Table 5.1 The main differences in climate and energy policies between KEV2023 and KEV2022 (Source: PBL, 2023a)[166]

Sector	Policy instrument with impact estimation
Electricity	Restriction of the energy tax exemption on natural gas input CHP plants Additional solar energy deployment on buildings 3 gigawatt of sunshine at sea
Industry	Expired dispensation rights in the case of customisation Standardisation of plastics (mandatory share of recycling or bio-based plastics)
Built Environment	Additional performance agreements with housing corporations, phasing-out of rented dwellings labels EFG as of 2029 Standardisation of heating installations Stimulation of hybrid heat pumps existing construction ISDE supplement Sustainable Social Real Estate Subsidy Scheme (DUMAVA) phase-out worst energy labels for utility construction Introduction of energy performance requirements for industrial buildings Sustainable National Real Estate National Heat Network Subsidy Scheme
Agriculture – livestock and arable farming	New derogation decision (inclusion reduction in manure production ceilings) National Termination Scheme for Livestock Sites (LBV) Nationwide cessation scheme for peak load livestock production sites (LBV plus) Targeted purchase measure (MGA-1) Measure Targeted Purchase and Termination of Livestock Farming (MGAB)
Agriculture – energy (in particular glasshouse horticulture)	Restriction of the energy tax exemption on natural gas input CHP plants Removal of a modified pathway from reducing the energy tax rate for greenhouse horticulture Energy saving scheme (EC scheme) Impact of mandatory approved list of measures for glasshouse horticulture (EML) from 1-7-2023 Subsidieregeling warmtentenetten glasshouse horticulture networks
Use of land	12.000 hectares of additional forest (from the specific nature SPUKS benefits)

166 Annex 2 provides a complete overview of which policies have been taken into account in the KEV2023.

Sector	Policy instrument with impact estimation
Mobility	Renewable Energy Directive (REDIII) Use of biofuels on road traffic increased by 20 petajoules Pay by Use Strengthening CO2freight performance Abolish BPM exemption for vans Introducing CO2base zero-emission trucks in truck charges Roadmap and Memorandum of Understanding Schoon and Emissieloos Buildings Subsidy for charging infrastructure construction Upscaling of GWW (ground, civil and civil engineering) Load infrastructure for road transport Extend zero-emissions zones for municipalities
Rising across sectors	Green gas blending obligation Introduction ETS2 as of 2027 Tariff adjustment of energy taxation (technical starting point) Strengthening energy savings obligation payback time requirement to 7 years Electrolyse onshore (500-1.000 megawatts) Electrolysis offshore (500 megawatts) Higher opening round SDE + + 2024 and 2025 Promotion of gasification projects (EUR 600 million)

If the policies known on 1 May 2023 (for which an impact assessment could be made) were developed and implemented in a timely manner in all sectors, it is conceivable that in 2030 total greenhouse gas emissions would be 46 to 57 % below 1990 levels (see Table 5.3). As a result, emissions are around 16 megatonnes of CO2eq lower than estimated with defined policies according to the KEV2022 (as described in chapter four). This brings the -55 % target within reach.

Table 5.3 Estimation of greenhouse gas emissions in 2030 according to the KEV2022 (with adopted policies only) and the KEV2023 (including policies on the agenda), and the sectoral residual missions (policy chosen sectors that determine how much a sector is allowed to emit in 2030) in megaton CO2eq. (Source: PBL, 2023a)

Sector	Range of emissions estimation with defined policies in 2030 (KEV2022)	Fire width estimation of emissions with defined, planned and agenda policies in 2030 (KEV2023)	Indicative residual missions in 2030
Electricity	6-21	9-23	13,0
Industry	32-47	27-42	29,1
Built Environment	15-21	12-18	13,2
Mobility	27-32	18-25	21,0
Agriculture	21-24	19-22	17,9
Use of land	3,0-4,2	2,5-3,7	1,8
Total	**114-139**	**97-123**	
Reduction compared with 1990	39 % – 50 %	46 % – 57 %	

The relatively highest emission reductions from agenda policies are expected in industry and the built environment. In industry, this concerns the establishment of tailor-made arrangements with major emitters and the promotion of the deployment of renewable hydrogen in industry and refining, in response to the REDIII targets.

The (emission) impact of the measures on pricing waste incineration and the obligation to apply a minimum share of plastic recycling or bio-based plastics in plastics production from 2027 is still unclear, as these measures have not yet been elaborated in detail.

In the built environment, emission reduction from agency policies is mainly expected from incentivising hybrid heat pumps, additional performance agreements with housing corporations following the abolition of the landlord tax and the sustainability of utility buildings under the EED and Energy Performance of Buildings Directive (EPBD). The policy measures targeting the services sector are expected to have a savings effect from maintaining the energy savings obligation.

The embedded measure “blending obligation for green gas in the built environment” has not been allocated to the sector built environment, but included in the range for the national total including estimated agenda policies, as green gas is blended into the

natural gas grid and also leads to emission reductions in other sectors.

Smaller contributions from the part of the policies on the agenda for which an impact assessment could be made are expected from the mobility, land use and agriculture sectors. Mobility concerns, for example, measures such as the abolition of the BPM exemption for commercial vans, additional incorporation of biofuels into road traffic and the introduction of a system of Betalen to Use in 2030.
In agriculture, emissions are expected to decrease due to fiscal measures in the glasshouse horticulture sector and the National Termination Scheme for Livestock Sites (LBV). In land use, the peatland strategies and the measures set out in the forest strategy play a role.

The policy on the agenda, whose effects have been assessed, leads to additional electricity demand in a number of sectors. This is particularly evident in industry, the built environment and mobility. As a result, emissions from the electricity sector are increasing in 2030 compared to the estimate with adopted and planned policies. In the first years after 2030, emissions from the electricity sector are expected to fall again due to the further increase in offshore wind energy.

With the part of the 2030 agenda measures for which no impact estimate could be made in the KEV2023, an additional emission reduction can be achieved towards 2030 and beyond. Examples of planned measures for 2030 without an impact estimate in the KEV2023 include the implementation of the Fuel EU Maritime from 2025, regulations for CO2free gas plants and negative emissions and the obligation for batteries in large solar parks.167 There are also examples of listed measures with no impact estimate that are more focused on the post-2030 period. These include the introduction of the ZEB (zero emissions buildings) standard for dwellings, the construction of new nuclear power plants and the lengthening of the Borssele nuclear power plant.

Target range ESA Emission Budget

For the Netherlands, the indicative ESR emission budget for the period 2021-2030 has been rounded to 833 megaton CO2eq. According to the KEV2023, this objective is in sight: with all climate plans, the Netherlands amounts to 794-834 megaton CO2eq. This amounts to a cumulative surplus of 39 megatons to a deficit of 1 megaton CO2eq. Emissions are lower than those estimated in the KEV2022 with the adopted and planned policies. The difference is mainly due to additional reductions in the mobility sector and the built environment.

LULUCF emissions

Total net LULUCF emissions are estimated to decrease to 2.5 megaton CO 3,7 eq in2(PBL, 2023a), including the policy on the agenda from the Spring Package. The decrease is explained by a decrease in emissions, in particular from grassland, and additional uptake by forests.

The national target for the Netherlands for 2030 – a reduction of 0.435 megaton CO2eq compared to the 2016-2018 average – is also achieved in the estimate, including on the agenda policy. The cumulative targets for 2021-2025 and 2026-2 030 are also within reach: based on the KEV2023, this would result in a positive balance of credits in both periods.

II Renewable energy

In the KEV2022, with adopted policies alone, the share of renewable energy was expected to increase to 30,5 [26,9-32,6]% in 2030 (see chapter four). In the KEV2023, the policy changes that can be estimated to have an impact estimate of between 32 % and 42 %. The expected minimum contribution of 39 % stemming from the REDIII is within the range of the estimate. This should make the new objective achievable with the policy adopted in the KEV2023. However, it is a prerequisite that the climate plans are designed and implemented as intended and that non-manageable factors (such as energy prices and the weather) also contribute to the share of renewable energy.
In the KEV2023 estimate, 100 to 106 petajoules more renewable energy is expected in 2030 than in the KEV2022 with adopted policies alone. This is the impact of several policy changes. The biggest contribution is expected from the additional deployment of biofuels resulting from the implementation of REDIII and the measure included in the Spring Package to use additional biofuels in road transport, which together account for some 20 to 60 petajoules of additional renewable energy. In the KEV2023, the projected growth of solar electricity in the built environment has also been revised upwards by 10 to 16 petajoules and the increase in land-based renewable electricity by 4 to 36 petajoules. Due to the standardisation of heating installations, additional

167See Table 1.2 of the KEV2023 (p. 27) for an overview of the main policy changes that were not sufficiently developed at 1 May 2023 to make an impact assessment.

ambient heat is expected between 15 and 21 peta-joule in the built environment. The blending obligation for green gas could generate between 0 and 13 petajoules additional green gas. In addition, gross final energy consumption is between 93 and 97 petajoules lower than in the KEV2022. This decrease in gross final energy consumption also contributes to a higher share of renewable energy.

The REDIII also introduces and strengthens sub-targets for industry, mobility, built environment and heat. The purpose of the sub-targets is to speed up the integration of renewables in sectors where incorporation has been slower. In the case of sub-targets for specific sectors, there are still several interpretations in the calculation method of the relevant indicators. The conclusions on target scope are therefore indicative.

I Renewable energy in industry

The first sub-target for industry is an indicative annual increase of 1,6 percentage points of renewable energy in final energy and final non-energy consumption in industry. In 2020, the share of renewable energy in industry was 5 per cent. In the KEV2023, the share of renewable in industry in 2030 stands at 10-17 %, i.e. an average annual increase of 0,6 to 1.3 % per year. As a result, the sub-target of 1.6 % annual increase is not yet met. The growth of renewable electricity production in the Netherlands is responsible for most of this increase.

The second sub-target for industry concerns the use of renewable fuels of non-biological origin (RFNBOs*)* for final energy and final non-energy use.
This should be at least 42 % of hydrogen consumption in industry in 2030 and 60 % in 2035. In 2020, total hydrogen use in industry and refining was estimated to be around 180 petajoules. Part of this is not covered by the obligation because it concerns hydrogen which is a by-product or is made from residual gases.
Hydrogen use in refineries only includes the production of building blocks for the chemical industry; hydrogen use for the production of motor fuels is excluded. The hydrogen use in industry and refining to be taken into account in the calculation of the 42 % share is around 81 petajoules.

The KEV2023 uses petajoule green hydrogen from electrolysis in 2030 27-40 in industry and the refining sector as a whole. The lower end of the estimate is based on the availability of subsidies and the upside assumes that the RFNBO obligation is realised through a purchase obligation. In case of minimal deployment of green hydrogen in refining to meet the transport target, sufficient domestic production of green hydrogen is available to meet the industrial target. However, if a larger share of green hydrogen goes to refining, the industrial target will not be met.

II Renewable energy in mobility

The scope of the renewable energy deployment obligation in the mobility sector is extended in REDIII to cover the total supply of fuels to transport, including bunker fuels for international aviation and shipping. The Netherlands has opted for the (binding) target of a 14.5 % reduction in greenhouse gas intensity in the transport sector in 2030. The total renewable energy demand in mobility to meet REDIII is estimated at around 160 petajoules. Of this, the contribution of biofuels is estimated at 130 petajoules, renewable electricity at 24 petajoules and RFNBOs at 5 petajoules. In 2022, the total consumption of biofuels for international transport and road transport was equal to 45 petajoules. Achieving this sub-target therefore requires a significant scaling up of the deployment of biofuels.

III Renewable energy in the built environment

As part of the REDIII, an indicative sub-target has been agreed to increase the share of renewable energy in the energy consumption of the built environment in the European Union to 49 % by 2030. Member States may

decide on their own national contribution to this objective, which is consistent with this objective. Article 15 of the REDIII states that this is renewable energy produced or supplied on-site or nearby from a network such as the electricity grid, heat network or gas network. As the European Commission has yet to develop the calculation method, we have had to make a number of choices in the calculation method itself. For example, we assume that the built environment consists of the residential and commercial and public services sectors in Eurostat statistics.With the policy changes in the KEV2023, the share of renewable energy in the built environment may increase further to 41 to 49 % by 2030. The increase is mainly due to the expected growth in the use of heat pumps and the growth in renewable electricity supply. Compared to the share of renewable energy in the built environment of 17 % in 2021, the REDIII target of 49 % in 2030 proposes almost tripling over a period of less than ten years. The challenge is therefore significant. The sub-target is exactly the upper limit of the range calculated in the KEV2023.

IV Renewable heat

In REDIII, the indicative target for an annual increase in the share of renewable energy for heat has been adjusted. Including the indicative top-up, this results in a renewable heat growth target for the Netherlands of 1,9 percentage points per year over the whole period 2021-2030. In 2020, the share of renewable heat was 8,1 per cent. This share remained at a similar level in 2021. In 2022, the share of renewable heat was 8,8 per cent. In the KEV2023, the share of renewable heat increases to 17 to 24 % in 2030, representing an increase from 0,9 to 1,6 percentage points per year in the period 2021-2030. The range is determined by uncertainty surrounding successful implementation of climate plans. An important factor here is the increase in the number of heat pumps. Savings in energy consumption for heat also contribute to an increase in the share. With the additional climate plans in the KEV2023, the binding part of the renewable heat growth sub-target of around 0,95 percentage points per year on average over the period 2021-2030 is within reach, but the target including the indicative top-up of 1,9 percentage points per year is not yet reached.

In addition, REDIII states that Member States shall aim to increase the share of energy from renewable sources and from waste heat in district heating by an indicative figure of at least 2,2 percentage points per year in the period 2021-2030 compared to 2020. The heat labels of large heat grids show that in 2020 the share of renewable energy in total heat produced was 36.5 % and the share of waste heat 8 %, together 44.5 %. In the KEV2022, the share of renewable heat in district heating increases to 51 % in 2030 and the share of waste heat to 13 per cent, together 64 %, an increase of 2 percentage points on average per year. No new estimate of these shares of renewable energy and waste heat in district heating has been made in the KEV2023.

III Energy efficiency

As part of the European Commission's 'Fit-for-55 package', the revised European Energy Efficiency Directive, the Energy Efficiency Directive (EED), was published in October 2023. Article 4 requires Member States to collectively ensure a reduction of final energy consumption by at least 11.7 % in 2030 compared to projections for energy consumption for 2030. This translates into an upper limit for the Netherlands' final energy consumption of 1.609 petajoules and for primary energy consumption of 1.935 petajoules.168 The consumption limit for final consumption is binding on Member States collectively, while the primary energy consumption target is indicative. Final energy use is the energy use of end users, while primary energy consumption also includes the production and supply of energy (including transport and energy conversion losses).

Chapter 4.2 describes that the final energy consumption of the Netherlands in 2030 is estimated at 1.872 petajoules under the KEV2022 policy. The KEV2023 expects final energy consumption from 1.566 to 1.818 petajoules in 2030. This means that the increased target of 1.609 petajoules is within the range of the estimate, but this can only be achieved if everything is done, including non-controllable influences such as energy prices and the weather (PBL 2023b). The climate plans set out in the Spring Package contribute to saving final energy consumption by promoting (hybrid) heat pumps, improving the sustainability of rented dwellings with poor energy labels, the energy saving obligation, moving towards mobility, and tailor-made arrangements in industry.

However, the indicative increased primary energy consumption target of 1.935 petajoules in 2030 is still out of reach. According to the KEV2023, primary energy consumption is expected to range from 1.951 to 2.323 petajoules in 2030.

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In addition, the EED also includes a binding energy savings obligation on cumulative final energy consumption through national policies for the period 2021-2030 (Article 8). Over this period, Member States will have to deliver annual savings of 0.8 % of final energy consumption in the years 2021 to 2023, 1.3 % in the years 2024 and 2025, 1.5 % in the years 2026 and 2027, rising to 1.9 % in the years 2028 to 2030. Member States should only count energy savings achieved through policy measures. The

The Netherlands chose to use the 2020 EU Reference Scenarios for the calculation of the targets.

cumulative effect ensures that savings are generated over the years and thus that the sooner a (structural) saving effect is achieved, the longer it can count.

The increased target of cumulative savings for 2021-2030 is 1.285 petajoules for the Netherlands (see Annex 3 Energy saving methodology document for an explanation). With the policies included in the KEV2023, cumulative savings of 1.168-1.415 petajoules are expected. The objective is therefore within reach, provided that the implementation of the climate plans maximises impact and that energy savings can be substantiated through monitoring in the reports to the European Commission.169

5.2 Impact of planned policies and measures on the economy

This section focuses on the impact of climate and energy policies on the macro-economy, income and employment. The impact of climate and energy policies on safety, health and nature is discussed in section 5.3.

I Economic review of the European "Fit-for-55 package"

In 2022, the Central Planning Bureau (CPB) provided an economic review of the Fit-for-55 package proposed by the European Commission on 14 July 2021 (CPB, 2022b). The economic analysis looks qualitatively at the extent to whichtheCO2 reduction package can achieve in a cost-efficient manner and the possible impact on the Netherlands. Attention will be paid to the main elements of the package and to the package as a whole.
It was not possible to pass on the package to public finances and to increase the burden on businesses and households at that time. This is because, among other things, the package prescribes objectives and obligations that still need to be implemented, especially with national measures. Thus, the economic analysis does not (explicitly) take into account (new) national policies designed to deliver on the higher ambitions, both national and European, for 2030. However, the economic analysis gives a (qualitative) indication of the possible economic impact of a strengthened European climate and energy policy on the Netherlands.

Overall, the package is a step towards achieving more cost-efficient CO2reduction. The European Commission's 'Fit-for-55 package' is broadly focused on pricing of CO2emissions, encouraging companies and households to better take into account the negative externalities of CO2emissions. The package will reduce the risks of a worsening competitiveness of European companies and a leakage of CO2emissions to countries outside the EU with an EU border tax (CBAM; see a recent analysis below).

The macroeconomic impact of the package is expected to remain limited. The European Commission's impact assessment report shows model estimates between -0.4 % and + 0.5 % for EU GDP in 2030 (EC, 2020). The competitiveness of businesses is largely maintained through the provision of free allowances and the introduction of the European Carbon Border Adjustment Mechanism (CBAM) (see further analysis below). For households, the purchasing effects of a higher CO2price are not necessarily evenly distributed.
There may also be large differences between countries and sectors. Countries that are relatively affected by increased CO2prices are compensated through funds, which are matched by ETS revenues. In addition, part of ETS revenues flow to Member States. For the Netherlands, these revenues could add up to around EUR 3.4 billion in 2030. This is significantly higher than the proceeds of EUR 0.9 billion in 2021. This is mainly due to the higher CO2price and revenues from the new ETS2.

Higher ETS prices will mean that the energy-intensive industry in the Netherlands will have to make them more sustainable. Companies without cheap reduction opportunities will face an additional burden. As described in Chapter 2.2, carbon leakage, production losses and employment effects at macro level appear to be limited. Industry in the Netherlands is also supported, inter alia, by the SDE + + subsidy scheme. However, impacts can be much greater for specific sectors and companies. On the other hand, with a higher ETS price, the unprofitable top of CO2 reducingprojects is smaller and therefore the subsidy amount per project is smaller.

The introduction of emissions trading for buildings and road transport will increase the burden on households and businesses. How much depends on the CO2price, but also to what extent excise and energy taxes will be adjusted in response to these price increases. The tight labour market in the Netherlands makes it difficult to achieve rapid sustainability in the built environment. A sufficient number of professionals and fitters are needed to isolate all houses and install heat pumps. This is currently a challenge due to the tight labour market in the Netherlands. In 2022, the PBL examined labour market bottlenecks in implementing climate

169See Annex 3 for a description of the energy savings monitoring methodology.

policies to reduce national greenhouse gas emissions by (at least) 55 % by 2030. It shows that the main bottlenecks to climate policy implementation are expected for higher education engineering professions such as engineers and architects, and to a slightly lesser extent for MBO engineering and crafts professions, such as machine technicians, metal processors and construction workers (PBL, 2022c).

The increased minimum rates in the proposed amendment to the Energy Taxation Directive do not lead to substantial changes for the Netherlands. In the Netherlands, the current rates are already above the proposed minima. According to the proposal, electricity will have to be taxed at a lower level than natural gas. This therefore calls for a substantial revision of the current ratio of tariffs and has implications for costs for end-users. Adjusting the energy tax structure has the potential to have a significant impact on the public budget, households and businesses. An indicative calculation example shows that adjusting the rate could have a significant budgetary impact, in the order of -10 to + EUR 6 billion per year.

II Effects of carbon pricing industrial activity

Current policies encourage companies to reduce the use of fossil energy. This is done, inter alia, by explicitly pricing carbon with a CO2tax or emissions trading system, but also through fuel taxes, subsidies, standards and restrictions. All these policies determine, explicitly or implicitly, how expensive or attractive it is for companies to emit carbon. Rising carbon costs may harm the economic activity and competitiveness of companies. Moreover, companies may be able to avoid locally increased carbon costs by relocating their activities to weaker regulated jurisdictions.
This could go hand in hand with an additional increase in CO2emissions elsewhere in the world. Such so-called CO2 carbon leakageeffects reduce the effectiveness of domestic climate action.

In 2023, the CPB examined evidence at international company level on the impact of explicit and implicit carbon costs on economic activity (CPB, 2023a). Production data from 3.1 million companies from 32 countries and 15 industrial sectors in the period 2000-2019 were used for this purpose. The study finds little evidence of negative effects on performance, such as profits, productivity and turnover growth of an average industrial company. However, the study finds a limited reduction in employment in the order of 2 % with a USD 50/tCO2 increase in carbon costs. On the contrary, investment is being increased. However, the effects differ significantly between sub-groups of companies. Performance effects are most pronounced in sectors prone to CO2 leakageand in EU countries. In particular, limited drops in employment are observed in capital-intensive companies and small businesses in carbon-sensitive sectors, mainly in mining, cement and base metals. In carbon-sensitive sectors, capital-intensive firms were also increasing their investments and small firms improved their productivity. In all sub-groups, profitability and the likelihood of exit are hardly affected by carbon costs.

These results suggest that companies mainly react to rising carbon costs by adjusting their production process rather than relocating. However, relocation and CO2leakagecould become more important for countries that implement more ambitious climate policies than others. This also depends on a large number of factors other than direct carbon prices such as, inter alia, agglomeration benefits, the tax system, policy design and institutional factors. In addition, future-oriented businesses anticipate upcoming changes in climate policies and possibly different consumption behaviour around the world. This study underlines that climate policy, certainly internationally, can be strengthened with limited economic damage.

III Intergenerational distribution of financial burdens due to climate change

In 2023, the CPB carried out a pilot study on the intergenerational effects of climate change and policies (CPB, 2023b). In order to capture the intergenerational distribution, an estimate of the costs of climate change has been made. Three types of costs were examined. First, damage: as a result of climate change, the Netherlands will be confronted with changes in the physical environment. These include drought, heat, water nuisance, river floods and sea level rise. Secondly, in order to cope with these physical consequences, adaptation policies, such as increasing dykes, can be pursued. Third, mitigation policies are in place: the Dutch outgoing government wants the Netherlands to become climate neutral by 2050. All three of these developments entail costs which may be partly channelled through public authorities. The extent to which the public authorities will bear the costs is a policy choice. For example, measures that discourage or prohibit the emissions of CO2 will cost the public authorities little, while subsidies will have a budgetary impact. At the same time, the costs that are not borne by the government will be passed on to households and businesses.

Most of the costs of climate change and climate policies are likely to be borne by future generations. The costs of climate change are likely to increase further in the Netherlands in the future, as well as the financial burden of climate policy. Moreover, future

generations also experience the negative effects of climate change that are not or difficult to express in monetary units. Financing the costs of climate change with debt can further increase the financial burden for future generations.
There is a high degree of uncertainty around cost estimates, especially the longer the time horizon. Nevertheless, it is likely that the costs will be substantial. The impact of climate change on the Netherlands also depends heavily on international efforts to mitigate climate change.

IV Effects Carbon Border Adjustment Mechanism (CBAM)

The EU decided in 2023 to introduce the Carbon Border Adjustment Mechanism (CBAM) for a number of sectors covered by the ETS. This should reduce the 'leakage of CO2emissions' due to relocation of production. An importer of products covered by CBAM will in the future pay an import levy on the CO2emissions released from production equal to the ETS price. If a price for CO2 has already been paid in the country of origin when producing the product, it is deducted from the import levy due. Over a period of nine years, between 2026 and 2034, CBAM will be phased out and free allowances for the sectors concerned are phased out at a faster pace than the free allowances for other ETS companies.

A joint study by the Central Planning Bureau (CPB) and the Environmental Planning Agency (PBL) examines the effects of CBAM compared to the old situation where companies in CBAM sectors received free allowances (CPB and PBL, 2024). The study shows that CBAM is more effective than free allowances in limiting CO2leakage. The expected leakage rate for CBAM is around one third smaller than for ETS with free allowances. CBAM increases import costs by pricing the CO2content of an imported product. Free allowances, on the other hand, offset the increase in a company's production costs due to its own European climate policy. On average, production outside the EU is more polluting than inside the EU. The increase in import costs from CBAM will therefore be greater than the decrease in own production costs due to free allowances. CBAM therefore improves the competitive position of European companies on the European market compared to those outside the EU. Therefore, CBAM is expected to lead to more domestic production in the EU and less relatively more polluting imports from non-EU countries, and thus also to a smaller CO2 leakage dueto relocation of production.

5.3 Impacts of planned policies and measures on safety, health and nature

The policy measures in national climate and energy policies reduce the use of fossil resources, which tend to generate benefits for health, safety and nature. For example, greenhouse gas emissions tend to reduce emissions of air pollutants (see further explanation below). These substances have an impact on air quality and thus on nature and health.

I European air pollution emission targets

PBL provides a biennial picture of the expected future evolution of national air pollutant emissions, complementing the Climate and Energy Outlook. In 2023 PBL determined the projected emissions of nitrogen oxides (NOx), ammonia (NH3), sulphur dioxide (SO2), particulate matter (PM2,5 and PM10) and non-methane volatile organic compounds (NMVOC) on the basis of the KEV2022.

Emissions of air pollutants have fallen sharply in recent decades and the decline is likely to continue in the coming years (PBL, 2023b). As a result, the European emission targets for air pollutants in 2 030 are within reach (see Table 5.5). European targets do not require major changes and will largely be met thanks to European emission requirements for new vehicles, vessels and industrial installations. In addition, reducing the use of fossil fuels through climate policies contributes to reducing emissions. The effects of the envisaged policy (as a difference to the variant with adopted policy only) are given in Table 5.6. The differences with adopted policies alone are limited.

Table 5.5 Estimulation of emissions of NOx, NH3, particulate matter, SO2 and NMVOC in adopted and planned policies and compared to European reduction targets; in kilotonnes (source: PBL, 2023b)

	2005	2020 EU-NEC target 2020		Estimate 2030 EU-NEC target 2030	
Nox	396	180	218	138-140 [125-157]	154
NH3	153	124	133	116 [108-122]	121
Fine particulate matter (PM2,5)	27.8	14,6	17,5	12,9 [12,3-13,7]	15,3
RU2	67	20	49	20 [15-22]	32
NMVOCS	209	186	192	149	177

[141-159]

Table 5.6 Reduction effect of planned policies on emissions of air pollutants according to the NEC Directive; in kilotonnes (Source: PBL, 2023b)

1	2025	2030	2035	2040
Nox	3	4,5	4,5	5
NH3	0	0	1	1
RU2	0,05	0	0,1	0,2
Fine particulate matter (PM2,5)	0	0,1	0,1	0,1
NMVOCS	1	2	3	4

In addition to the transferable emission effects of adopted and planned policies, an estimate has also been made of the conceivable emission effects in 2030 of policies on the agenda (see Table 5.7). In the KEV, the policy on the agenda is divided into those for which a (quantitative) assessment could be made, and those for which there were insufficient indications for quantification (see also paragraph 4.1).

Table 5.7 Reduction of the impact of agenda policies on emissions of air pollutants according to the NEC Directive; in kilotonnes (Source: PBL, 2023b)

	2030	comment
Nox	8	As a result of national policies to accelerate the deployment of zero-emission construction machinery and a European shore-side electricity obligation for seagoing ships
NH3	7	Excluding scheduled Sustainable Agriculture Transition Programme (NLPG)
RU2	—	Policy on the agenda is not sufficiently concrete
Fine particulate matter (PM2.5)	0,215	Excluding industry policy on the agenda
NMVOCS	0,8	As a result of the National Termination Scheme for Livestock Sites

II Safety and health impacts of climate policy

RIVM carried out a study in 2021 to identify the potential health and safety risks of the measures in the 2019 Climate Agreement (RIVM, 2021a).

Most health gains are achieved through improved air quality. With fewer internal combustion engines, nitrogen oxides and particulate matter will be reduced in the air. As a result, people are less likely to suffer from asthma, lung diseases and cardiovascular diseases. In the Netherlands we live on average nine months less because of air pollution. These nine months are reduced by more than 2 % as a result of the measures in the Climate Agreement in 2030. So, on average, we live slightly longer.

Environmental noise is also reduced if internal combustion engines fail. Electric motors are quieter, especially at low speeds within built-up areas. Car traffic on these roads will reduce noise by 1 decibels in 2030 and 3 to 4 decibels in 2050. This may reduce sleep disturbance caused by traffic by one third in 2050.

In the workplace, the main benefit of the Climate Agreement is that appliances no longer produce diesel smoke in 2050. This reduces lung cancer among workers. This accounts for around 3 % of the total health damage caused by workers' exposure to substances at work.

In terms of safety, the main benefit is that carbon monoxide poisoning is no longer caused by domestic natural gas installations. If these facilities are no longer in place in 2050, this would lead to between 10 and 50 deaths per year.

On balance, the RIVM expects that the energy transition will bring health gains, but new forms of energy can also cause health problems, including noise pollution among local residents. Additional measures to mitigate the negative health effects of new forms of energy are therefore also important.

III Health effects climate change in the Netherlands

RIVM has mapped the effects of climate change on health and safety (RIVM, 2021b). It has been examined how these effects will develop in the Netherlands in a situation with and without international climate policy. Sea levels will rise less and slower as a result of international policies, and extreme weather, such as violent bellies, will be less frequent. This reduces the risk of flooding and thus risks to safety. In 2024, RIVM published an update on the health impacts of climate change (RIVM, 2024). RIVM looked at heat, air quality, mental health, UV (ultraviolet) radiation, allergies (pollen) and infectious diseases.

The best informed impact of climate change on health is the number of additional deaths due to the higher annual average temperature: an average of 250 deaths per year. Climate change includes more hot days (above 20 degrees). There are also more heatwaves, which are longer and heavier. As a result, more people die than normal. In the 2023 climate scenarios of the KNMI, this has been further calculated (KNMI, 2023). Climate change increases the number of deaths related to heat and cold in the future. The population is growing in the future. As the proportion of older people is also increasing, the group of people vulnerable to extreme temperatures is growing. In the current climate, we have related more deaths to cold (5800 cases per year) than to heat (660 cases per year). This may be reversed around 2100: in the high emission scenario (Hd), there are more deaths related to heat (11.000 cases per year) than to cold (6600 cases per year). In the case of high greenhouse gas emissions (Hd), more than 2100 people die from heat prematurely than at low emissions (Ld) around 8000. About half of future temperature related

mortality is also driven by population growth and ageing. The calculations do not take into account heat tolerance or adaptation measures such as more trees and more shading.

Heat and drought often coincide with many airborne pollen and high concentrations of ozone (summer mog). This allows people to get the bubbles, especially if they already have respiratory diseases. The growing season takes longer and there are more pollen in the air. More people can get hay fever or their complaints can worsen. In addition, people are exposed to more UV radiation for various reasons. For example, because the sun appears more hours, there are fewer clouds and people are more external with sunny weather. This increases the risk of skin cancer. In addition, certain infectious diseases, such as legionellosis, are now becoming more common as a result of climate change. The Legionella bacterium, which causes this disease, grows up in hot water and can be inhaled by mist. For example, if it rains hard after a warm and dry period. In addition, ticks are active for a longer period in the year, which has increased the chances of getting Lyme disease. In addition, climate change can have a negative impact on mental health due to the threat it poses and experiences of extreme weather.

The Public Health Future Allocation (VTV) expected to be published by RIVM in June 2024 will also describe the expected health impacts of climate change and the most vulnerable groups.

5.4 Overview of investment needs

The figures presented in this section give an indicative and preliminary picture of the expected and needed investments.

I Existing investment flows and future planned investments in relation to planned policies and measures

Every year, the government is accountable for climate policy with the Climate Paper. As an annex to the Climate Note, a financial statement showing the achieved public funding per policy measure for the previous year, the (provisional) funding for the current year and the expected funding for the next five years is also included.170 This overview is updated annually by the responsible ministries and is broken down by (upcoming) climate action by the sectors of electricity, industry, built environment, agriculture and land use, mobility and sector of overwhelming measures. This overview provides an insight into realised and expected public investments due to climate policies with a time horizon of five years. However, no specific analysis is available on the investments needed to reach the 2030 targets.

Indicative picture of national costs of policy measures for 49 % reduction

The previous pass-through of the (draft) Climate Agreement by PBL (2019a, 2019b) provided an insight into the national costs171 and investments expected at the time in order to achieve the then applicable climate target of 49 % reduction by 2030. It showed that national costs in 20 301.6 billion to EUR 1.9 billion were incurred. The cumulative investments in the period 2 019-2030 amount to EUR 56 billion. The above figures concerned the increase in national costs and investments in 2030 compared to the 2017 projections (the PBL's "NEV2017" with the policy variant "defined and planned policies without new SDE + opening after 2019"). The difference between the lower and upper limits was due to uncertainty in the design of the policy toolbox proposed in the draft Climate Agreement and the response of actors to it. Environment uncertainties were, in principle, not included in the ranges presented, but the uncertainty in other external developments (such as energy price developments) was high, making the total uncertainty band width around costs greater than the range reversed by design and behavioural uncertainty.

National costs can also be broken down by cost of capital (interest and depreciation on investments), energy costs and other operating costs. It illustrates that the energy transition is leading to a more capitalised energy system with lower costs for purchasing energy carriers (in particular coal, oil, gas). In the previous pass-through of the Climate Agreement by PBL (2019b), the cost of capital increases by EUR 4,0-4.9 billion per year. Energy costs are decreasing by EUR 3,0-3.4 billion per year. Other operational costs increase by EUR 0,6-1.4 billion per year. National costs are the balance of these large items in absolute terms, and are therefore relatively sensitive to other assumptions about exogenous developments affecting the cost of capital and energy prices.

The cumulative additional investments in the period 2 019 to 2030 (additional to the investments in the reference) were estimated at around 56 to 75 billion euro at the time (see Figure 5.1) (PBL, 2019b). In this estimate, investments in the electricity sector account for about half of this. In the electricity sector, uncertainties due to design and behavioural uncertainty are small, but they are high due to environmental factors (such as the cost development of renewable electricity production and grid costs).

Figure 5.1 Investments in the implementation of the draft Climate Agreement compared to baseline path, 2019-2030 (source: PBL, 2019b)

170Climate Memorandum 2023, Annex 1114092 to Parliamentary Document 32813 No 1307.

171National costs are the annual additional costs for the Netherlands as a whole (relative to a baseline path) and show the aggregated financial effects of climate policy in a single figure representing the balance of capital costs, savings and revenues (PBL, CPB, 2020); or 'the sum of annual national CAPEX and OPEX excluding taxes and subsidies but including savings' (Kalavasta, Berenschot, 2021). This is because domestic taxes and subsidies do not constitute a cost or benefit under this national supervision, but are only considered as transfers between government and other parties (the national balance remains zero).
The cost of capital is annual amortisation of investments over the lifetime of the installations in which the investment is made.

Bron: PBL

The above-mentioned PBL was based on the draft Climate Agreement, but in view of the additional declaration since then (from 49 % to 55 % reduction in 2030) and the government's target of a 60 % reduction, these previous findings need to be supplemented. However, it should be noted that the additional estimate of national costs cannot be easily compared with the previous pass-through because both the policy content and the baseline situation have changed.

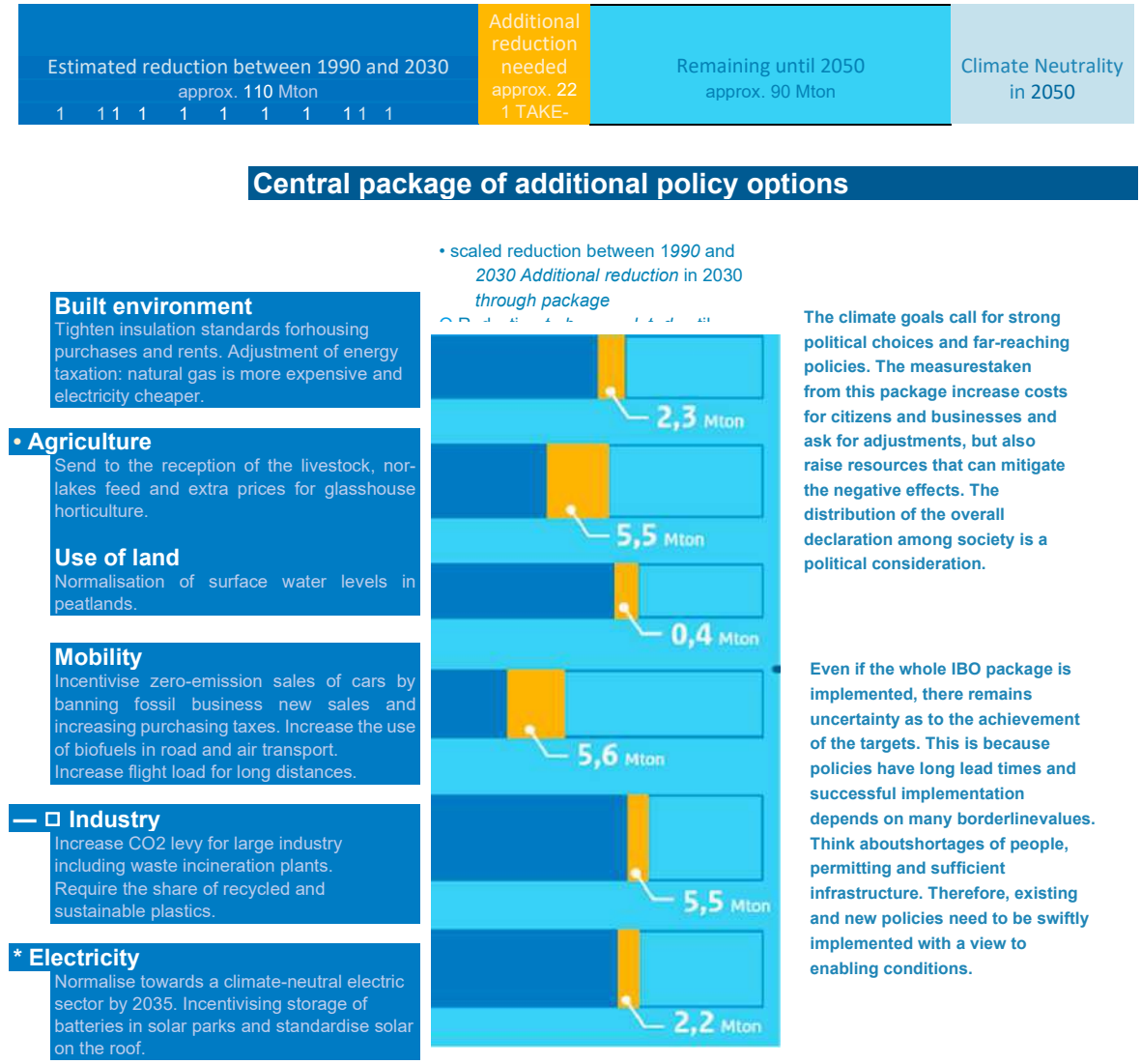
Indicative picture of national costs of additional policy measures for 55 % reduction

For the national costs of the policy package announced in the Spring Climate decision to reduce greenhouse gas emissions by at least 55 % by 2030, the Interdepartmental Policy Studies (IBOs)172 'Financing Energy Transition: Policy choices in costs, incentives and distribution" (2021) and "sharp goals, sharp choices: additional normative and pricing national climate policies for 2030 and 2050' (2023); and the accompanying annexes 'Essay on the financing of the Energy Transition between 2020 and 2050' (Kalavasta, Berenschot, 2021) and 'Central Package Cost Transit Account' (CE Delft, Berenschot, 2023). These studies, while consistent with each other, give an indicative picture of the national costs of climate policies that reduce emissions by 55 %. The different choices made by the government in the Spring Climate decision to achieve the 55 % reduction compared to those envisaged by IBOs will change the national costs (and sectoral distribution). As a result, the necessary investments presented below only provide an indication of what can be expected in terms of national costs for the time being.

The Climate IBO (2023) identifies a policy gap of 22 megaton CO2eq emission reduction to meet the increased climate target of 60 % reduction by 2030. The estimate of 22 megatons (in addition to the expected reduction of already agreed policies) is based on an updated version of the estimate of the policy on the agenda in the KEV2022. The IBO Working Group presents a central package of additional policy options to reduce CO2emissions by 60 % in order to meet the 55 % target in line with the mission mandate and the Coalition Agreement (see Figure 5.2). In addition, two illustrative variants of political choices for certain measures and the sectoral distribution are outlined. However, only the central policy package has been further developed in the cost pass-through of CE Delft and Berenschot (2023).

172IBOs develop policy options for key policy areas. Such policy research is commissioned by the Cabinet and is carried out by interdepartmental working groups. IBOs are official investigations carried out independently of politics.

Figure 5.2 Central package of additional policy options (source: IBO, 2023)



Thecalculation of national costs by CE Delft and Berenschot is largely based on the Energy Transition Model (ETM).173 The ETM is an open source calculation model that includes the Dutch energy system and can calculate the total investments for a given scenario and associated national costs. ETM was previously also used by Kalavasta and Berenschot for the annex to the IBO Energy Transition (2021), 'Essay on Financing the Energy Transition between 2020 and 2050' and the climate neutral scenarios developed by them in the 'Integrated Infrastructure Outlook 2030-2050' (2021) commissioned by the network operators.

As described in the cost note, the costs of the measures included in the central policy package for the energy system are calculated by sector. The costs per sector were then divided by the CO2reduction in megatone in order to arrive at the estimated national costs permegaton CO 2reduction for the different sectors. It is explicitly stated that this is not entirely equivalent to national costs, but merely gives an indication of the national costs (CE Delft, Berenschot, 2023). In addition, measures targeting non-energy emissions (e.g. land use and agriculture) fall outside the scope of the model used and for such measures the costs are approximated with a weighted average per megaton from the other sectors.

Two scenarios are used in the pass-through in order to arrive at an indicative range of national costs. The lower value is based on the KEV2022 (46 % reduction). This is most likely to underestimate the costs given that the CO2reduction target (in megatons) is lower than the IBO package would achieve. It is assumed that additional CO2reduction usually results in the application of more

173https://energytransitionmodel.com/.

expensive measures per tonne of CO2 avoided, after the cheaper options have already been applied. The upper value is based on the 'IP Climate Agreement' scenario in the Energy Transition Model. In the IP scenario, the CO2reduction in 2030 is between 91-96 megatone (58-60 % compared to 1990), meeting the 55 % emission reduction target and the 60 % target within reach (CE Delft, Berenschot, 2023). The estimated additional costs per additional megatone of CO2reductions achieved (compared to a baseline scenario without implementing additional CO2reduction measures) are shown in the table below for both scenarios.

Table 5.8 Estimated additional costs per additional megaton CO2reduction in the IBO policy package (source: CE Delft, Berenschot, 2023)

Sector	Cost per megaton KEV2022	Cost per megaton IP Climate Agreement
Industry	257	346
Transportation	241	250
Households	378	581
Built Environment	348	461
Greenhouse horticulture	435	280
Energy	241	250
Weighted average	304	385

Based on the above additional costs per megaton CO2reduction, the national costs of the central package of additional policy options from the Climate IBO are estimated (see Table 5.9), resulting in a total cost of EUR 5,9-7.2 billion for the additional CO2reduction of 22 megatons in 2030 (in addition to the measures KEV2022). This estimate is not complete as it concerns only the national costs of the energy system and may underestimate the actual total national costs. As described in the note, the cost data in the table below include the annual costs of the technical measures, both investment costs and operating costs, and give an indication of how the costs of the policy package will evolve. The costs are gradually increasing from the introduction of the policy measures, but no intermediate calculations have been made for the path (CE Delft, Berenschot, 2023).

Table 5.9 Indicative costs of IBO policy package in 2030 (source: CE Delft, Berenschot, 2023)

Sector	Co2reduction in megatone	Net Value (EUR bn/y)	Above value (EUR bn/y)
Built Environment	2,3	EUR 0,8	EUR 1,1
Agriculture	5,7	EUR 1,7	EUR 2,2
Use of land	0,4	EUR 0,1	EUR 0,2
Mobility[1]	5,6	EUR 1,4	EUR 1,4
Industry	5,4	EUR 1,4	EUR 1,9
Electricity	2,2	EUR 0,5	EUR 0,6
Total	**22**	**EUR 5,9**	**EUR 7,2**

[1] excluding international air and maritime transport.

II Risk factors of the sector or market concerned or national or regional barriers

Several factors have a significant impact on emission reductions and investments that can be expected from the package of policy measures announced by the government.174 In general terms, the following factors are involved:

- Uncertainty of form. Political choices on policy measures still need to be made and the design of policy instruments remains open. This may lead to different outcomes. Determine the choices still to be made in the detailed design of whether more or less emission reductions can be achieved.
- Uncertainty of conduct. The extent to which policy instruments will change the behaviour of actors is uncertain. For example, agreements in their neighbourhoods could allow households to react quickly to tax incentives, but they may also wait for options to become cheaper. In many cases, it is not possible to dissociate the uncertainty of design and behaviour, inter alia because behavioural uncertainty is partly linked to the design of the instruments.

174Parliamentary paper 32813, No 1230.

- Environmental uncertainty. Exogenous developments are uncertain, such as the development of international energy markets, European emissions trading or policies in neighbouring countries. Technological developments are also uncertain. These uncertain environmental factors affect uncertainty through prices, markets and technology. The effects of many policy instruments depend heavily on how prices will develop. Decision making and further developing agreements on the additional policies needed to achieve the increased climate targets will reduce the uncertainty of design and thus indirectly reduce behavioural uncertainty. The environmental uncertainty relates to the dynamic context in which Dutch climate policy comes into being. Dutch policy has only a limited impact on this.

III Analysis of additional public financial support or public funds to address the shortcomings identified in point ii

The additional investments needed to achieve the increased climate target of 55-60 % reduction by 2030 should be mobilised through the use of policy measures. Most emission reductions and investments are achieved through subsidies, standardisation and pricing. The SDE + + is important in the uptake of renewable energy and plays a major role in the expected reductions and investments by industry, such as CCS.

A combination of standardisation, pricing, subsidisation and facilitation encourages industry to become more sustainable. The tailor-made arrangements with the largest industrial emitters are being stepped up and extended to more companies in order to reach 3.5 megatons of additional reduction compared to the CO2 levy. To avoid leakage of emission reductions, it shall be ensured that the dispensation rights exempted by the customised arrangements will no longer be available to other companies. The rate of the CO2levy for taxable emissions above 50 kilotonnes is also increased to EUR 216/tonne CO2 in 2030 (2030 prices).175 In addition, theCO2levy for the ASAs is strengthened. Furthermore, the tax exemption for dual use of coal (as fuel and raw material) in industry will be abolished as of 2027 and a ban on the use of fossil fuels in heating processes by extension, new construction and replacement of industrial production facilities is under way.

In the built environment, subsidies for residential owners play an important role in combination with prizes and the aforementioned neighbourhood approach. Additional investments are made to make vulnerable neighbourhoods and villages facing a high share of energy poverty more sustainable. Through the Heat Fund, lower-threshold funding is made available for low and (low) middle-income earners by extending the 0 % interest rate. In addition, additional funds are available in the Investment Subsidy Sustainable Energy and Energy Savings (ISDE) to support the investment in, inter alia, insulation and heat pumps. The Heat Infrastructure Subsidieregeling (WIS) scheme has been published to finance the unprofitable top of heat networks. There is also a policy to encourage landlords to make their homes more sustainable. For example, the National Performance Agreements with housing corporations have agreed to phase out rented dwellings with poor energy labels (E, F or G) by the end of 2028. In addition, a subsidy has been made available to private landlords for housing sustainability and maintenance through the Subsidieregeling Verdurzaming en Onderhoud Rental Housing (SVOH) Subsidieregeling Verdurzaming en Onderhoud Rental Housing (SVOH).

In the case of mobility, the package with different standards and subsidies is the main contributor to the uptake of electric passenger cars, while the government is investing in additional charging infrastructure for electric vehicles.

Pricing also plays a role in reducing emissions and stimulating investment. In recent times, there has been an increasing public debate about the benefits for users of fossil fuels and raw materials that do not allow sustainable alternatives to be sufficiently developed. There are no structural direct fuel price subsidies in the Netherlands. However, various expenditure schemes are (indirectly) linked to fossil energy consumption, fiscal fossil exemptions, rebates and adjusted tax rates. The Cabinet gave an overview of all these schemes in the 2024 Miljoenbrief. This overview will be updated annually.

The government has already phased out several of these schemes in recent years. For example, the refund scheme in the energy tax on electricity in favour of energy-intensive businesses was abolished with effect from 1 January 2023. In addition, energy tax benefits will be phased out in the next few years: energy taxation is becoming less degressive and a number of exceptions in the field of energy taxation are gradually adjusted. These include phasing out the reduced rate of energy tax on natural gas for the glasshouse horticulture sector and limiting the existing input exemption from the energy tax on natural gas for use in so-called combined heat and power plants (CHP). In addition, the tailor-made arrangements, the plastics blending obligation and the strengthened requirements of the European Renewable Energy Directive (REDIII) will further phase out fossil fuels and raw

175The Main Line Agreement is expected to change this policy (see Box on Main Line Agreement Chapter 1).

materials in the coming years. And the Dutch commitment to negotiations on the European Energy Taxation Directive (ETD) aims at accelerating fiscal greening across the EU.

The phasing out of fossil schemes should be carefully weighed and should not be an end in itself, but viewed in a broader perspective of pricing externalities and climate policy goals. Any further phasing out of these schemes should therefore be carefully considered, taking into account, inter alia, (accumulation of) burdens and burden-sharing, carbon leakage effects and the impact on new business.

Recently, the report on Building blocks for a better tax system, in which the various schemes set out in the Miljoenbrief have developed possible paths. A subsequent government will have to decide whether and what measures are being phased out.

State budget available in the years 2 022 to 2028

The current (outgoing) government budget has budgeted public funds to finance the policy measures. Table 5.10 shows the budgeted expenditure (by sector) in the period 2 022 to 2028. Table 5.11 shows the income foregone due to green tax advantages. This does not give a full picture of the investments needed, but the public contribution to it.

Table 5.10 Overview of climate policy expenditure by sector (in 1000-EUR) (source: Budget Note 2024)

Sector	2022	2023	2024	2025	2026	2027	2028
Electricity	3.922.290	2.400.751	1.861.113	1.758.233	4.475.995	4.489.158	4.519.243
Industry	83.958	910.004	1.203.764	1.115.699	973.966	913.398	873.202
Built environment	608.686	1.240.294	1.696.424	1.510.759	982.929	729.419	598.533
Mobility	145.419	222.946	438.741	393.452	247.849	164.915	133.875
Agriculture and Land Use	80.148	146.880	192.645	189.990	195.714	200.377	194.024
Cross-sector and other measures	247.341	666.029	791.945	1.030.957	1.033.969	1.021.655	1.004.986
Totals	**5.087.842**	**5.586.904**	**6.184.632**	**5.999.090**	**7.910.422**	**7.518.922**	**7.323.863**

Expenditure is grouped according to the sector classification of the Climate Agreement to which the expenditure contributes most directly. However, some expenditure also contributes to making other sectors more sustainable. Moreover, climate spending is presented in the same way as in the budget of the department responsible for policy content. The overview shall include all planned expenditure in departmental budgets falling within the definition of climate spending. Annex 7 provides an overview of expenditure by budget line.

The expenditure in Annex 7 mainly consists of grants to stimulate the development and deployment of CO2reducing technologies in the different sectors or guarantees for financial risks that may arise. Most of these projects are privately funded for the most part and where the public subsidy or guarantee in question is intended to eliminate the unremarkable part of the business case for businesses or citizens. In some cases, for example in the case of highly public infrastructure projects, the grants cover a larger part of the total project costs or charge tariffs to network operators.

Table 5.11 also lists relevant tax advantages until 2027. From a factual point of view, these are not expenditure, but revenue foregone. These tax advantages are intended to stimulate investment in CO2reducing techniques by citizens and businesses.

Table 5.11 Overview of fiscal green subsidies (in EUR x 1.000) (source: Budget Note 2024)

Tax regime	2022	2023	2024	2025	2026	2027
Energy Investment Deduction (EIA)	297.000	249.000	259.000	299.000	299.000	299.000
Environmental Investment Deduction (MIA)	206.000	192.000	194.000	194.000	194.000	194.000
Arbitrary depreciation of environmental investments (Vamil)	23.000	25.000	25.000	25.000	25.000	25.000
	390.000	378.000	483.000	730.000	0	0
EV passenger cars tax incentives (KA package)						

Tax incentives EV (not applying HADK, encouraging more private rather than business)	20.000	191.000	217.000	16.000	0	0
EB netting scheme	335.000	607.000	564.000	336.000	307.000	257.000
EB reduced rate for charging stations EV	9.000	30.000	41.000	0	0	0
EB reduced rate locally generated renewable energy	0	0	0	0	0	0
Totals	**1.280.000**	**1.672.000**	**1.783.000**	**1.600.000**	**825.000**	**775.000**

Foreseen revenues and funding from European funds

The expenditure discussedabove is financed from the General Resources (Treasury). The General Resources consist of all government revenues, including taxes and excise duties paid by people and companies. The 2024 Million's note estimates EUR 402.9 billion. However, these revenues are not linked to specific expenditure (such as for climate and energy).

Part of the government's climate and energy spending is financed by European funds. In addition, direct funding is also available from European funds for other public authorities, businesses and citizens. Table 5.12 gives an overview of the main funds where funding is available for climate and energy expenditure in the Netherlands.

Table 5.12 Available funding from European funds for climate and energy projects in the Netherlands[1])

European fund or scheme	Description	Focus	Type of funding	Available for investments in climate and energy in the Netherlands
European Regional Development Fund (ERDF)	Strengthens economic, social and territorial cohesion in the EU. Enables investment in a smarter, greener, connected and more social EU	Diverse (including energy)	Diverse (such as grants, loans and guarantees)	EUR 506 million over the period 2021-2027 (of which around EUR 124 million for climate or energy)
Interreg A and B	Fostering European cooperation and combating border barriers	Diverse (including energy)	co-financing	EUR 378.7 million over the period 2021-2027 (not dedicated to climate or energy)
Recovery and Resilience Facility (including REPowerEU)	Post-coronavirus support to recover and future-proof countries	Diverse (including energy)	grants and loans	EUR 3 billion (tbc “green transition”)
JUST Transition Fund	Supporting territories strongly affected by the transition to climate neutrality	climate transition	subsidies	EUR 623 million for the period 2021-2027
Social Climate Fund	The aim is to accommodate groups and companies for increased burdens resulting from the introduction of ETS2	climate transition	co-financing	EUR 720 million for the period 2026-2032
Connecting Europe Facility (CEF) – Energy	Helps the clean energy transition to make the EU’s energy system more integrated, smart and digital	energy transition	Diverse (such as grants, loans and guarantees)	EUR 121 million (so far)
Connecting Europe Facility (CEF) – Alternative Fuels Infrastructure Facility (AFIF)	Supports alternative fuels infrastructure	energy transition	grant combined with a loan	EUR 42 million in the period 2021-2027
European Investment Bank (EIB)	Regulates loans and other financial instruments for businesses	Diverse (including energy)	loans	EUR 915 million for 6 projects accepted in 2021-2023
European Local Energy Assistance	Provides financial support to local authorities and organisations to develop a project plan for a large investment	Energy	subsidies	EUR 38 million for the period 2014-2023
InvestEU Fund	Promotes sustainable investment, innovation and job creation in the EU	Diverse (including energy)	guarantees	Unclear which projects contribute to the Netherlands
Life Clean Energy Transition (CET)	The objective of the CET sub-programme is to promote sustainable energy, to meet the 2030 energy and climate targets and to build a long-term decarbonisation strategy towards 2050	energy transition	co-financing	18.5 million (so far)
Life Climate Change Mitigation and Adaptation	The aim of this LIFE sub-programme is to stimulate projects that contribute to a climate-resilient economy based on renewable energy.	climate transition	co-financing	52 million (so far)

European fund or scheme	Description	Focus	Type of funding	Available for investments in climate and energy in the Netherlands
Innovation Fund	The fund supports the development of innovative, low CO2technologies. This will make it possible to find solutions to make European industry CO2neutral, while ensuring a competitive position	climate transition	subsidies	EUR 265 million (so far)
Renewable Energy Financing Mechanism	Allows investments in renewable energy projects	energy transition	subsidies	The Netherlands has not yet made use of this
Horizon Europe	Funds research and innovation	Diverse (including energy)	subsidies	EUR 99 million for honoured energy projects (so far)

[1] prepared on the basis of publicly available information in November 2023.

Description of the use of public-private financing

For this purpose, the use of resources from the central government and from European funds has been described. However, a large part of the transition needs to be privately funded. The government is therefore in consultation with a large number of parties, including Invest-NL, BNG Bank, the European Investment Bank and the financial sector, on how to make finance for the transition better available. With the financial support measures described in the previous paragraph, the government aims to ensure that the projects needed for the climate and energy transition become increasingly profitable. This will also increase the possibilities for these organisations to finance these projects. By remaining in consultation with them, the Cabinet ensures that each can make the best contribution from its role and that possible bottlenecks are identified as soon as possible.

Invest-NL, as a National Promotional Institute and Impact Investor, is in a position to contribute to the creation of public-private financing of projects. By being able to take a slightly higher risk than the market as an impact investor, Invest-NL, as the first investor, can contribute to the business case and thus attract other private financiers to enter the market, highlighting also the possibilities to benefit from public subsidies or tax advantages. In addition, Invest-NL is exploring possible solutions to financing issues where the market is not emerging or where bottlenecks are identified, for example in improving the sustainability of the built environment. As a result, Invest-NL can play an important role in the development of projects using mixed, public and privately funded financial instruments.

5.5 impacts of planned policies and measures on other Member States and regional cooperation

In November 2023, the Netherlands, together with the Benelux Secretariat, organised a dialogue meeting to discuss the cross-border impact of energy policy in the Pentalateral context (the Netherlands, Belgium, Luxembourg, Germany, France, Austria and Switzerland) and with countries that are part of the North Seas Energy Cooperation (NSEC). A common understanding of cross-border impacts has been agreed. In 2023, the Penta ministers again agreed to include a joint paragraph in the new concept of INEKs. The North Seas Energy Cooperation (NSEC) countries have also agreed to add a joint North Sea paragraph to the INEK. The (English) joint texts are included in Chapter One (Section 1.4). In addition, joint texts have been prepared on the cross-border impact of energy policy in the Penta (see Box 5.1) and NSEC countries (see Box 5.2). These texts were drawn up following dialogue meetings in March.

Box 5.1 benefits of regional cooperation

As a member of the Pentalateral Energy Forum, the Netherlands cooperates with other Pentas countries on various aspects of the energy transition. Penta's actions and intentions for coordinated energy system planning, resource allocation, flexibility and market policy were presented in paragraph1.4 II.
The Pentalateral Energy Forum functions as a strategic alliance, pooling resources and efforts from Member States to boost the energy transition. Through coordinated planning, knowledge sharing and joint initiatives, the region strives for a sustainable and resilient energy future.

Expected impacts of joint efforts in Penta

The following sections discuss the expected impacts of the joint efforts within Penta, focusing on the impact of the commitments made within Penta on the region and how these actions will contribute to an improved energy system.

Security of supply: Across the Penta-region, differences in geography and existing assets provide a range of flexibility possibilities. Efficient and smart investments in flexibility across the region benefit everyone if we take into account the flexibility needs of neighbours. With the insights from the Penta-report on "Power System Flexibility in the Penta Region", further steps can be taken. By exploiting the unique geographical and infrastructural benefits of each country, the Penta-region can guarantee a secure and reliable energy supply. Penta's joint approach not only optimises the use of resources, but also promotes energy security through diversification. This will ensure that the available flexibility is shared across the region.

System and market integration: By coordinating energy system planning, Penta aims to optimise investments from a regional perspective rather than a national perspective. In particular, better investment is expected as a result of cross-border coordination of grid development. The Penta-countries are able to identify and promote the most cost-effective and cost-effective energy infrastructure projects through regional cohesion policy. This approach not only improves the efficiency of the energy system, but also facilitates the integration of renewables into the energy system and contributes to the objective of unlocking the electricity system CO2 by 2035.

Energy efficiency and CO2 release of the electricity system: By expressing jointly that Penta has the objective of releasing the electricity system by 2035 CO2, the disincentives for first-movers are mitigated.

It also encourages all Penta-countries to take bold steps towards this endeavour. This shared ambition reduces the risk for individual countries to lead the implementation of new policies and technologies. It also creates a positive dynamic in which countries can learn from each other's experiences and best practices. Moreover, the shared commitment of the CO2to free the electricity system sends a strong signal to the market, potentially attracting investments in renewable energy and energy efficiency technologies. The Pentaa report on "Building blocks for a common vision for a decarbonised electricity system in the Penta region" has played an important role in formalising this collective goal.

Moreover, through a common backcasting project, with the aim of a CO2free electricity system in 2 035 in mind, the Pentaa Forum will clarify the necessary steps for the next decade in the energy transition pathway. This further contributes to the predictability of the regional transition.

Concerning hydrogen: Asthe energy transition progresses, hydrogen becomes a key element in the energy mix. Penta-countries recognise the potential of hydrogen as a clean energy carrier that can contribute to the decarbonisation of the electricity system for CO2. By promoting cooperation in the development of hydrogen technologies and infrastructure, Penta-countries will move towards a more future-proof hydrogen system.

Cooperation supports and supports the quality of hydrogen and the development of standards by a substantial group of key countries. Together, these countries legitimise these resulting standards and will support their use. In addition, Penta-countries' efforts will contribute to regulatory harmonisation, promote research and development and coordinate the deployment of hydrogen infrastructure across the region.

Box 5.2 Joint NSEC declaration on the benefits of regional cooperation

Expected effects of joint efforts in the NSEC context

As a member of North Sea Energy Collaboration (NSEC), the Netherlands is working with other Member States and the European Commission on various aspects of wind energy deployment in the North Sea. NSEC's actions and intentions focus on coordinating offshore energy system integration, spatial planning, environmental and market policies. Through coordinated planning, knowledge sharing and joint initiatives, NSEC aims to achieve a sustainable transition of the North Sea.

Cooperation within NSEC on offshore wind energy production has significant potential for different impacts, such as fostering system integration between countries, fostering the development of offshore hydrogen production (and storage), optimising energy yields, mitigating the impact on ecosystems and scaling up the supply chain.

Energy system integration

First, system integration between Member States is expected to increase the efficiency and stability of the offshore energy network. By sharing expertise, countries can optimise energy production, reduce fluctuating energy supply and increase the reliability of the electricity grid, thereby maximising the use of wind energy. This will ultimately contribute to higher costefficiency of investments.

Moreover, the integration of energy markets among members contributes to increased efficiency and resilience in light of fluctuating energy demand and supply disruptions. By harmonising regulatory frameworks and facilitating cross-border energy trade, NSEC cooperation can increase energy security and foster economic growth in the region.

Development of offshore hydrogen production (and storage)

NSEC works together to promote offshore electrolysis by sharing knowledge. The development of offshore hydrogen production facilities could provide an innovative solution for energy storage. Using excess wind energy to produce hydrogen at sea offers an opportunity for energy storage and cheaper transport. This development not only facilitates the integration of renewable energy into existing systems, but also fosters the transition to a hydrogen-based economy, promoting sustainability and energy security.

Mitigating the impact on ecosystems

The (cumulative) impacts of offshore wind farms on marine ecosystems require careful consideration. While offshore wind farms contribute to reducing CO2emissions and mitigating climate change, they pose potential risks to marine habitats and species. In order to minimise potential harmful effects, NSEC calls for closer and more integrated planning within other platforms such as Greater North Sea Basin Initiative (GNSBI). Cooperative efforts within NSEC encourage comprehensive environmental impact assessments and the implementation of mitigation measures to reduce damage to biodiversity and ecosystem functions.

Upscaling the supply chain

Accelerating the deployment of offshore wind energy infrastructure will put pressure on the (European) supply chain, especially in terms of production facilities, installation equipment and ports. Close coordination between stakeholders is essential to address potential bottlenecks and ensure the timely and cost-effective realisation of offshore wind projects. To help scale up the supply chain, NSEC provides clarity and certainty to the supply chain regarding the pipeline of offshore wind projects. This reduces the risk of potential bottlenecks and increases the likelihood of timely and cost-efficient realisation of offshore wind projects.

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Attachments

Annex 1 Response to European Commission recommendations
Attached as a separate document

Annex 2 Overview and description of policy measures
Attached as a separate document

Annex 3 Methodology document Energy saving
Attached as a separate document

Annex 4 Reporting of parameters and variables
Attached as a separate document

Annex 5 Greenhouse gas emissions projections
Attached as a separate document

Annex 6 Potential Analysis of heat and power old 2024
Attached as a separate document

Annex 7 Integrated climate overview according to the 2024 national budget
Attached as a separate document

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